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ABSTRACT

The effects of an experimental, interdisciplinary, outdoor education program on selected students enrolled in a 2-year elementary teacher preparation program were measured. The sample consisted of 76 second year students; 39 students in a naturally assembled class were the control group, and 37 in another class were the experimental group. The main treatment experienced by the experimental group was a 4-day, off-campus outdoor education experience. Four scales were used to measure student perceptions toward the structure of educational experiences, the learning environment, student to student relationships, and student and teacher relationships. A pretest and 2 posttests were administered. It was found that the program contributed to statistically significant and favorable changes in students' attitudes on 3 of the 4 scales related to conditions that existed in the professional education classes, that it had no statistically significant effect on attitudes concerned with student to student relationships, and that it may have caused a favorable change in attitudes toward what should be a desirable condition in the elementary school. Recommendations included that the interdisciplinary program should be expanded, that the study be replicated, and that different treatments be measured. (PS)

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# AN EVALUATION OF AN INTERDISCIPLINARY PROGRAM IN AN ELEMENTARY TEACHER-EDUCATION CURRICULUM

by

Joseph Adam Kalla

A Project Report
Submitted to the Department of
Curriculum and Instruction and
the Graduate School of the University of
Wyoming in Partial Fulfillment of the
Requirements for the Degree
of Doctor of Education

University of Wyoming
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ABSTRACT

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Introduction

The purpose of the study was to measure the effects of an experimental, interdisciplinary, outdoor education program on selected students enrolled in the two year elementary teacher preparation program of the University of Saskatchewan, Regina Campus. An attempt was made to determine changes in student attitudes and values caused by the experiment.

Population

The sample consisted of seventy-six second year students in the elementary teacher education program. Thirty-nine students in a naturally assembled class were the control group. Thirty-seven students in another class were the experimental group. Each group had a common schedule and the same instructors for five teaching methods classes during the winter semester, 1972.

Procedure

The main treatment experienced by the experimental group was a four day off-campus outdoor education experience. Class instructors in art, health-physical education, mathematics, science, and social studies teaching methods cooperated in the implementation of the interdisciplinary program. Preparatory and follow-up activities occurred on the university campus.

The instrument used was the Education Attitude Index which was constructed by the researcher. Its four scales measured student perceptions toward: (1) the structure of educational experiences, (2) the learning environment, (3) student to student relationships, and (4) student and teacher relationships. Students answered questions in two categories: (1) should the condition be desirable in an elementary school, and (2) does the condition exist in the professional education classes at the university?

A pretest and two posttests were administered to the control and experimental groups. A factor analysis of the pretest results led to empirical confirmation of the four scales. Descriptive statistics were analyzed to detect differences between the means of experimental and control groups. Two-way analyses of covariance were used to detect differences between the means of the cumulative grade point average groups, and between the means of the home place of residence groups. The two-way technique was also used to measure the interaction between the treatment variable and the cumulative grade point average group variable, and the interaction between the treatment variable and home place of residence group variable.

## Findings and Conclusions

The program contributed to statistically significant and favourable changes in students' attitudes on three of the four scales related to conditions that existed in the professional education classes. The program had no ststistically significant effect on attitudes concerned with student to student relationships. Postive changes in attitude were both short-term and long-term although some regression occurred when students returned to

traditional classes. An analysis of patterns of means disclosed the control group developed a less favourable attitude toward conditions that exist in the professional program.

The patterns of means indicated the program may have caused a favourable change in students' attitudes toward what should be a desirable condition in an elementary school. The attitudes of the control group toward desirable conditions remained approximately the same. Students in the experimental and control groups had a much more favourable attitude toward index items pertaining to desirable conditions in an elementary school, than the same conditions that exist in the professional education classes.

## Recommendations

Indications of the development of favorable attitudinal changes toward educational programs that were desirable in elementary schools and that existed in the professional education classes warranted the recommendation that the interdisciplinary program should be expanded to include all second year elementary education major students of the Regina Campus. Additional recommendations were for: (1) replication of the study with different treatments, (2) measurement of the effect of a longer treatment (3) further analysis of the Index, and (4) evaluation of long-term attitudinal changes.

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# CHAPTER I

## INTRODUCTION

In 1970 the American Association of Colleges for Teacher Education (3:10) recommended that "A teacher education program must provide for more than the mere assembly of parts and pieces of knowledge; it must provide for total functional effectiveness." The Association reported that teacher education programs needed to be developed through the joint efforts of all needed university personnel. Furthermore, it concluded that special faculty groups were needed to assume direct responsibility for teacher education.

During the last two decades many institutions concerned with the preparation of teachers have reappraised their function. This assessment was the result of a complexity of factors, including criticisms of pre-service preparation of teachers. Such critical examination has led to an analysis of the structure of professional education and content area courses in teacher preparation programs.

A study of writings dealing with teacher preparation made by the writer of this report, indicated that many professional educators were concerned about the fragmentation of course work and experiences in pre-service programs. Stratemeyer (52:55) for instance, has stated that the content of education courses advocated integration of subject matter and teaching methods, but that little of this appeared in teacher preparation courses. She therefore recommended that experiments be made

in reorganizing teacher education programs, with the aim of integrating teaching methods and subject area courses.

McLaughlin (39:245-6) expressed corresponding opinions when he said that

> "...a curriculum designed to prepare modern teachers for modern schools must get far removed from the traditional, 'air tight' subject matter courses and provide more which cut across departmental lines and are organized on a functional, experience base."

He criticized courses as "too fragmentary and too departmentalized."

Similar deficiencies in teacher education programs were noted by Lindsey (37:140) and Smith (51:63) who reported that teaching methods classes were of questionable value due to repetition of subject matter from one class to another and because of too much theory and insufficient contact with children. They further stated that the proliferation of methods classes covering every subdivision of a subject was detrimental to good program development.

Several authors emphasized the necessity for a total approach to the planning of teacher education programs. Bruner (13:97) wrote that managing relevant instructional variables required the close collaboration of a team of experts. He concluded that a curriculum should be prepared and implemented jointly by subject matter experts, teachers, and psychologists who give "...due regards for the inherent structure of the material, its sequencing, and psychological pacing of reinforcement, and the building and maintaining of predispositions to problem solving." Secrest (45:7) went further and stated that academic disciplines were strengthened by interaction with each other, and that interdisciplinary learning in the classroom should be accompanied by

interdisciplinary research and experimentation. He believed that this "cross pollination" led to "dynamic interactions."

Herrick (29:119-22) even implied that a past shortage of teachers may have been due to a poor professional attitude caused by inferior pre-service training. He concluded that teacher-preparing institutions failed to carry out, in practice, those principles of learning which they advocated.

Other educators such as Dressel (22:62-86), Lindsey (36:407), Hilgreth (31:180), and Tyler (54:263-73) evinced a dissatisfaction with the piece-meal approach in the education of teachers. This concern of individual educators found an echo in the efforts of various organizations interested in teachers' education which began reexamining their standards and policies concerning pre-service programs.

Professional education organizations were interested in assessing both scope and sequence of programs, as well as the structure of methods classes. These problems were recognized in the 1958 yearbook (53:83-116) of the Association for Student Teaching, entitled Improving Instruction in Professional Education, produced in cooperation with the National Society of College Teachers of Education. Among difficulties acknowledged in typical pre-service programs were "...too great a proliferation of methods courses," and "...too little effort to make the teacher-preparation program an integrated set of experiences."

The American Association of Colleges for Teacher Education (4:50) recommended that certain conditions be observed in the preparation of elementary school teachers. One condition was:

> "Make specific provisions for students to observe and participate in desirable learning experiences of children prior to student teaching. In addition to courses designed for this particular purpose, opportunities for integrating these activities with professional courses should be fully explored and utilized."

The Association for Supervision and Curriculum Development, National Education Association (7:24-46), stated that the effective teacher must show a "...willingness to work 'in the spaces' between disciplines to facilitate discernment of relationships among them." Thus, it appeared that professional teacher education organizations considered as essential a cooperative relationship between colleagues, in order to encourage the development of broad educational programs. These include the many facets of integrated program planning and implementation.

A major limitation to the effectiveness of curriculum recommendations and changes was a lack of substantiated research. Goodlad (26:270) showed this awareness when he advocated a strong need for curriculum evaluation. He stated:

> "But one must look at curriculum planning in teacher education with a more jaundiced eye. Our objectives are not clear. Our evaluation stresses low-level cognitive abilities but sidesteps performance."

Educators have been somewhat successful in evaluating the effectiveness of instruction in the cognitive domain of human behavior, but achieved less in the implementation and assessment of educational objectives in the affective domain; yet substantive portions of published educational objectives for teacher preparation include affective components. Appreciations, attitudes, interests, and values are identified as desirable aims of programs.

## Statement of the Problem

The purpose of this study was to measure the effects of an experimental, interdisciplinary, outdoor education program on selected students enrolled in the two year elementary teacher preparation program of the University of Saskatchewan, Regina Campus. An attempt was made to ascertain changes in attitudes and values in four areas of the learning experience. These four areas were: (1) the structure of educational experiences, (2) the learning environment, (3) interpersonal relationships between students and students, and (4) between students and teachers.

The short-term and long-term effects of the program were evaluated for significant differences between: (1) the experimental and control groups, (2) the high cumulative grade point average group and the low cumulative grade point average group, and (3) the three types of home place of residence. Also interactions were obtained between: (1) the treatment and cumulative grade point average group, and (2) the treatment and home place of residence.

## Background of the Problem

Most University of Saskatchewan-Regina Campus elementary education students had a common second year curriculum. This organizational pattern is indicated in Figure 1.

FIGURE 1

ORGANIZATION OF THE TYPICAL SECOND YEAR PROGRAM
FOR ELEMENTARY EDUCATION STUDENTS
UNIVERSITY OF SASKATCHEWAN-REGINA

| SEPTEMBER OR JANUARY SEMESTER | SEPTEMBER OR JANUARY SEMESTER |
|---|---|
| 1. Education Methods Class | 1. Education Methods Class |
| 2. Education Methods Class | 2. Education Methods Class |
| 3. Education Methods Class | 3. Education Methods Class |
| 4. Arts and Science Class | 4. Education Methods Class |
| 5. Arts and Science Class | 5. Education Methods Class |
| | 6. Three Week Student Teaching Block |

A student was registered in one of ten sections, each section with an enrollment limitation of forty-five students. Students in a particular section were enrolled in the same education methods classes with a common schedule for two semesters. Students in each section had the same instructors. Methods classes taught during two semesters were art, reading, language arts, music, health and physical education, science, mathematics, and social studies. The blocking of the methods classes each semester presented opportunities for flexible scheduling, team teaching, and integrated instruction. This was particularly favorable during the semester when students were enrolled in the block of five education methods classes.

A pilot program which provided integration of instruction in art, health and physical education, mathematics, music, and science education methods classes was initiated during part of the January Semester,

1971. One section of students and their five methods class instructors participated in this three day off-campus, outdoor education experience in a provincial park, which provided the focal point for the program. Preplanning, implementation, and follow-up activities of an interdisciplinary nature were elements of this experience.

Some financial support was given by the Faculty of Education Special Projects Committee for this pilot project. At the conclusion of the project questionnaires completed by students and staff indicated overwhelming support for the program. Informal evaluation based on casual observation and subjective judgment substantially agreed with the responses to the questionnaire.

The initial success of the 1971 pilot project led to strong support by many students, staff, and the administrators of the Faculty of Education for the continuance of similar programs. This projected development of interdisciplinary outdoor education programs clearly indicated a need for empirically ascertained information in order to assess their effects on student participants.

A proposal for complete financial support for an experimental program during the January Semester, 1972, was presented to the Faculty of Education Special Projects Committee, and to the University Principal's Research Committee in November, 1971. Shortly thereafter both committees agreed to support the interdisciplinary, outdoor education project with the intent of obtaining an evaluation of certain aspects of the program. The focal point of the project was an intensive four day off-campus program in the Buffalo Pound Provincial Park, from March 12 to March 17, 1972.

Significance of the Problem

This study was designed to help the University of Saskatchewan Faculty of Education accumulate data which measured selected perceptions and evaluations of second year elementary education major students participating in an interdisciplinary, outdoor education experience. The expressed reactions of the students were analyzed and used to assess possible expansion of similar programs that might comprise larger numbers of students. These reactions were related to the philosophy of the Faculty of Education. Based upon the students' perceptions of this experience possible changes in the outdoor education program were considered.

The students' attitudes toward the program indicated areas which should receive further study and consideration within the context of the methods classes offered by the faculty. The desired outcome of this study, therefore, was to provide the Faculty of Education with the necessary data on which to base possible curriculum improvements.

Procedure Followed

Raw data on 87 second year elementary education major students participating in the outdoor education program were collected by the use of an Education Attitude Index devised by this writer. Two sections of students were represented, each of which was programmed in a common block of 5 methods classes during the January Semester of 1972. Each section of students had the same instructors and the same class schedule.

The Education Attitude Index (Appendix A) consisted of four

discrete scales: (1) The Structure of Educational Experiences, (2) The Learning Environment, (3) Student and Teacher Relationships, and (4) Student and Student Relationships. Each scale had two answer columns: (1) Do you feel that this is a worthwhile or desirable condition in an elementary school program? and (2) Do you feel that this condition exists in the professional education classes of the two year elementary education program?

The following raw data were recorded on data processing cards: sex; age; cumulative grade point average; education class grade point average; population of place of residence; and the two scores for each scale of the Education Attitude Index.

Data programming and statistical analysis were done through use of the Biomedical Computer Programs (21) BMD05V and BMD03V. Chapter III contains an explanation of the methods and procedures employed in gathering the data.

Limitations of the Study

1. The experimental and control groups were limited to students from the second year of the elementary-education-major program at the University of Saskatchewan, Regina Campus.

2. The nonequivalent sample representing naturally assembled sections was used, due to the inability to choose by random selection procedure. The threats (16:47-50) to internal and external validity inherent in quasi-experimental nonequivalent control group designs were present.

3. The sample was representative only of second year students

majoring in elementary education at the University of Saskatchewan, Regina Campus. Caution should be exercised in generalizing the results of this study beyond the limits of this particular population at this university.

4. The accuracy of the data was limited by the very students who completed the Education Attitude Index items. Complete accuracy was impossible because each student interpreted every statement within his own frame of reference.

## Definition of Terms

The following terms are defined to assist the reader in understanding their usage within this study:

Affective Variables. This term refers to those variables measured by individual differences in attitudes, interests and values.

Attitude(s). This term refers to a state of mind or feeling with regard to some situation.

Cognitive Variables. This term refers to those variables associated with measures of intelligence, aptitude, achievement and performance.

Flexible Schedule. This term refers to a time schedule for learning experiences subject to change whenever circumstances and program dictate.

Interdisciplinary Instruction. This term refers to instruction involving teachers from various subject area fields working together toward the achievement of common objectives through a variety of teaching techniques.

Individualized Instruction. This term refers to differentiation of instruction according to individual differences in students.

Professional Education Classes in the Two Year Elementary Education Program. This refers to: (1) Education 130 - Introduction to Education, (2) Education 120 (or Psychology 100) - Education Psychology, (3) Education 140 - Methods of Art Education, (4) Education 141 - Methods of Primary Reading Education, (5) Education 143 - Methods of Language Arts Education, (6) Education 145 - Methods of Social Studies Education, (7) Education 146 - Methods of Mathematics Education, (8) Education 147 - Methods of Music Education, (9) Education 148 - Methods of Health and Physical Education, (10) Education 149 - Methods of Science Education.

Team Teaching. This term refers to any form of teaching in which two or more teachers regularly and purposefully share responsibility for the planning, presentation, and evaluation of lessons prepared for the same group of students.

Two Year Elementary Teacher Preparation Program. This term refers to the two year program at the University of Saskatchewan - Regina Campus, which when completed, enables students to be certified by the Department of Education, Government of Saskatchewan, as elementary school teachers.

## Content of Succeeding Chapters

Chapter II contains a discussion of pertinent literature relevant to interdisciplinary instruction in university teacher preparation programs. Depicted in Chapter III are the methods and procedures used in collecting, analyzing, and reporting the data used in the investigation. Presented in Chapter IV is a discussion of the results.

The summary of the study, conclusions, and recommendations for further research are contained in Chapter V.

## CHAPTER II

## RELATED LITERATURE

A search of the literature on interdisciplinary teacher education programs revealed that most publications dealt with recommendations for such programs with descriptions of existing organizational patterns. Research studies which attempted to evaluate existing interdisciplinary teacher education programs were few. Thus, the review which follows is largely limited to descriptive and prescriptive literature; as a result, it includes only limited information about research evaluations of interdisciplinary teacher education programs.

Four general headings are used for the presentation of related literature: (1) recommendations for interdisciplinary teacher education by individuals, (2) recommendations for interdisciplinary teacher education by organizations, (3) descriptions of interdisciplinary teacher education programs, and (4) evaluation of interdisciplinary teacher education programs. The literature considered was related to the four scales of the Education Attitude Index developed by this writer for the evaluation of this project. These scales were: (1) The Structure of Educational Experiences, (2) The Learning Environment, (3) Student and Student Relationships, and (4) Student and Teacher Relationships.

### Recommendations for Interdisciplinary Teacher Education by Individuals

Educational psychologists have expressed the opinion that, in

order to reach a high level of comprehension of the learning experience, educators must integrate instruction. The Encyclopedia of Educational Research (40:588-589) defined integration as follows:

> "Man's attempts to describe the state of wholeness, or positive well being, and the process which leads toward it have led to the concept of integration."

Hilgard (30:74-75) supported this definition when he stated that the Gestalt learning theory was concerned with the learner moving from an understanding of the whole to an understanding of the parts making up that whole. He wrote that it is essential that parts should be seen as belonging to a unified whole. The Gestalt theory included the concept of insight. Bigge and Hunt (11:296) indicated that insight is shown when the learner senses the total picture, sees relationships among the parts, and applies this conceptualization to the solution of a problem.

The importance of educators understanding the total learning process and applying this knowledge to teaching strategies was also expressed by Skinner (49:80). He implied that teachers were not utilizing effective methodology and that there was a need for more attention to be given to teaching techniques. He further stated that teachers "...need the kind of help offered by a scientific analysis of behavior", and that they needed to understand "...the processes of learning and teaching."

Bloom (12:296) advocated integration of interdisciplinary program threads which would weave "...educational experiences into a fabric or organization" in order to give meaning to these experiences. He described these experiences as "...any idea, problem, method, or device

by which two or more learning experiences are related." These were the agents which would hold the parts together.

Combs (18:88-91) concluded that students should be exposed to an integrated block of courses which would lead to an understanding of the real issues of teaching as a related whole. He said these experiences were necessary to enable the student to see relatedness among courses.

An interesting analysis of general education and curriculum development was made by Bell (9:148-9) at Columbia, Harvard, and at the University of Chicago. He discovered that total curriculum development and learning was made sequential in the sciences, connective in the social sciences, and concentric in the humanities. He proposed three stages in teacher education: (1) one year of general background information, (2) two years of work with a discipline and its related subjects, and (3) one year of integrative and seminar work.

Other educational leaders such as Bigge (10:177), Woodruff (55:115), Hopkins (32:2-29), and Bloom (12:91) had supported the integration of learning experiences. The author found wide-spread support for an integrated method of pre-service teacher education among professional educators.

Recommendations for Interdisciplinary Teacher Education by Organizations

An examination of the literature related to this study had revealed that professional organizations supported the concept of integration of education courses whenever program demands indicated a need to do so. The Second Bowling Green Conference of the National Commission on Teacher Education and Professional Standards

Report (39:33) gave its support to the idea that many courses in education no longer should be separated and that such courses as are related be integrated.

The Association for Supervision and Curriculum Development, National Education Association (7:26-38) listed several standards for college teaching. These were:

1. Cooperative planning and teaching with colleagues are integral parts of college teaching.
2. Teaching techniques are varied in light of different curricular objectives and different maturity levels of the learners.
3. Provisions for individual differences is helped by the use of flexible arrangements.
4. Provision is made for independent individual group work, with the size of the group varying according to purpose.
5. Large blocks of time, when appropriate, are provided to facilitate teaching and learning.

The Association for Supervision and Curriculum Development recommendations advocated flexible use of time, team teaching, student and teacher planning, and individualization of instruction. The association concluded that an analysis of methodology, resources, and the teaching environment was essential to provide a rationale and operational base for teacher education classes and that "a not unfounded criticism of professional education courses is that they often cover similar if not identical ground."

Further suggestions for the reorganization of subject matter and teacher education methods courses into related content fields were offered by the Consortium of the State Universities of Ohio (19:254). This group issued a report, entitled Educational Specifications for a

Comprehensive Elementary Teacher Education Program, which included a conceptual plan for a model program. This plan incorporated concepts of multiunit schools, individual research, and program units utilizing team teaching and interdisciplinary instruction.

The standards and evaluative criteria for the accreditation of teacher education adopted by the National Council for Accreditation of Teacher Education (8:5-6) indicated strong support for the application of teaching and learning theory to professional studies. Standard 1.3.3 (8:6) indicated that "The professional component of each curriculum includes the systematic study of teaching and learning theory with appropriate laboratory and clinical experience." Institutions applying for accreditation were required to meet the NCATE criteria.

In 1963 the Association for Student Teaching published a bulletin (6:94-5) which observed the use of block organizational patterns in teacher education programs in the United States. The bulletin suggested that experimentation be made to measure the effectiveness of team teaching and of other instructional techniques to bridge the space between knowledge of the learning process and that of teaching practices.

The publications examined advised that redundancy was not sound, and that it was important to make the most efficient use of the time available to students and staff. Also, the planning and organization of teacher preparation experiences required clear understanding of course content and the responsibility for its implementation.

Descriptions of Interdisciplinary Teacher Education Programs

Most published literature concerning interdisciplinary programs in pre-service teacher education was descriptive and documentary. Closely associated with this literature were reports dealing with block programs and team teaching. The publications examined dealt only with material concerned with interdisciplinary teacher education programs utilizing team teaching. Information dealing with block patterns of organization was used when referring to interdisciplinary teacher education.

The Thirty-seventh Yearbook of the Association for Student Teaching (5:44) in 1958, reported that "There is a concerted effort to make both methods courses and student teaching more of a genuine 'real life' kind of experience rather than a contrived, artificial, or formal one." The experts consulted also indicated: "District efforts are being made to create a unified (rather than continue a compartmentalized) approach to methods courses and student teaching. General or fused methods courses are apparently more numerous than they were a few years ago."

The Thirty-seventh Yearbook (5) report on the "concerted effort" by teacher education institutions to structure "unified" approaches to course offerings was corroborated by a 1966 survey conducted by Grein (27:12-13). She made a report on the related professional literature written from 1950 to 1966 and also sent a questionnaire to six hundred eighty-eight member institutions of the American Association of Colleges for Teacher Education regarding integrated education classes. Five hundred sixty-eight replies were received.

Two hundred sixty-two institutions reported some form of block organizational pattern. One hundred ninety-three of the returned questionnaires indicated some form of integrated instruction.

A study made by Grein (25) showed that integration in teaching methods classes consisted of several activities. These activities were: (1) general lecture meetings covering topics common to all classes, (2) observation of demonstration lessons common to more than one subject area, and (3) preparation of and teaching a unit of study. Experiences were generally organized around problems, questions, practices, and concepts. Team teaching was common in general class sessions. Evaluation techniques utilized by staff members included discussion, student questionnaires, achievement records of students, and data furnished by the faculty. Of particular significance to this writer was the fact that no experimental research studies were reported.

When Allen (2:16-29) surveyed professional literature in 1965, she could report only eleven examples of integrated elementary education methods classes. When analyzing the catalogues of 250 colleges she found eleven integrated programs, but in these, objective evaluation was almost non-existent.

In 1969 two staff members of the Upper Midwest Regional Educational Laboratory (50:103) compiled a complete bibliography on team teaching and associated interdisciplinary education programs. This included ERIC and SRIS documents, books and pamphlets, films, periodicals, reports, papers, studies, proposals, and theses. Most of the material included in this bibliography was published after 1950. In examining the bibliography entries, this writer found only a small

number concerned with university teacher education programs and these were chiefly of a descriptive type.

Most professional literature concerned with interdisciplinary teacher education offered only subjective comments and general characterizations about programs. Interdisciplinary team teaching in the teacher education program at Southern Utah University was described in 1968 by Shirts, Meyers, and Vorkink (47:453-6). Aden (1:283-7) wrote about a similar program at North Texas State University. Martin (3:51) indicated that West Virginia Wesleyan College made use of flexible scheduling, individualization of program, and interdisciplinary team teaching in its pre-service curriculum. Descriptions of similar organizational patterns at other colleges and universities were mentioned by Dietz (20:45-49), Frost (25:158-69), Law (34:170-82) and Skeel (48:1-7).

Evaluation of Interdisciplinary Teacher Education Programs

Few research studies evaluating interdisciplinary teaching techniques in teacher education programs had been found by the investigator. The program designs studied were mainly of a pre-experimental (16:6-12) type. Some indication of the effects of such programs were obtained from an analysis of the studies that were available.

In 1959, several Los Angeles California State College faculty members conducted an interdisciplinary, team teaching program (44:409-12) for prospective secondary education teachers. Its objectives were to provide for professional staff development, close associations among students, a broad base for common educational

experiences, and encouragement for closer teacher and student relations. A student questionnaire was utilized to evaluate the course. The favorable comments listed by students were:

1. Enjoyed association with more than one professor +80%
2. Were stimulated by the specialized lectures given by team members +75%
3. Reacted favorably to the variety of experiences provided +75%
4. Reacted favorably to the value of divergent points of view and discussions following presentations +75%

Weaknesses noted by students were:

1. Professors appeared incompatible +35%
2. There were not enough small group discussions +50%
3. Class assignments were too demanding +20%
4. There was not enough contact with one professor -20%

The evaluation was a "one shot case study" (15:8) and as such was a pre-experimental design.

At the University of Texas, during the 1969-70 school year, an experimental program was organized; it offered thirty semester hours of blocked class work in the elementary teacher education curriculum. In this program science and mathematics were emphasized. Methods classes were alternated for the university students with increased responsibilities in public school classrooms. Butts (15:1-73) reported that the evaluation by students, university staff, and cooperating public school teachers was favorable. Again, the writer of this paper found that a pre-experimental design (15:8) was used to evaluate a program.

At Florida Atlantic University (24:1-53) a preservice education

program was conducted in which a two year sequence of four interdisciplinary education courses was offered. Its objectives were: (1) to help students acquire a feeling of adequacy as teachers and (2) to develop skills necessary for solving teaching problems. The evaluation tools employed in this program were the Graduate Record Examination, Advanced Education Test, student comments, and the opinions of student teachers who completed the program. When evaluating the results, it was found that improvements had occurred in all areas tested. The absence of a control group and an experimental group, random selection procedures, and pre-test and post-test scores, all posed design problems which made the interpretation of these results difficult.

Lund (38:1-22) conducted a survey as to the effectiveness of two types of teacher preparation programs at the Oregon College of Education. Evaluations of teaching success after graduation were compared for those who had participated in the traditional and those in the block program in pre-service education. The block program utilized interdisciplinary and team teaching techniques. The principals who participated in the evaluation process rated block-trained teachers significantly higher than those with traditional training.

In another evaluation, Cheers and Carter (17:139) examined two groups of education major students enrolled in traditional and experimental methods classes. They measured the knowledge of the students in elementary school curriculum classroom behavior, and their adaptability to changing classroom situations; for this they utilized various standardized and teacher-made tests. Tests were administered at the conclusion of the program. The experimental group scored significantly

higher in general educational background, professional information and behavior at the time of student teaching. No significant difference was reported in knowledge of elementary school subject matter and methods.

An investigation of lecture-tutorial, and team teaching methods of instruction in English classes at Central Missouri College conducted by Burns and Jones (14:1-13) revealed the latter method saved time, resulted in a sharper focus on subject matter, and more intensive communication between pupil and teacher. The evaluation device used was an anonymous questionnaire given to students and staff at the conclusion of the project.

Hammerman (28:176) conducted a research study on the effects of an interdisciplinary outdoor education experience on the understanding of the learning process by sophomore, junior, and senior students at Northern Illinois University. He also evaluated the effects of a seminar block program. No significant change in the understanding of the learning process appeared in either instance. Hammerman recommended that more research be made to evaluate (1) intragroup relationships, (2) student to teacher relationships, and (3) teacher to student interactions.

The investigator discovered only one report concerned with the effects of interdisciplinary team teaching on university instruction that described a true research design. Dupuis and Woerdehoff (23:132-6) investigated the differences which may occur in a traditional lecture class on one hand; and, on the other hand, in a class of students taught by a team of four instructors at Purdue University. A

course called The American School System was required of all education students. A nonequivalent control group design was used which adhered closely to procedures advocated by Campbell and Stanley (16:47-50). Achievement test results revealed significant changes which favored the experimental group. The researchers recommended that further research be done through a student and instructor attitude inventory.

Summary

A great amount of related literature pertaining to interdisciplinary teaching in pre-service teacher education programs was examined, the result of which indicated that many recommendations were offered by professional organizations and educational leaders who supported the concept of interdisciplinary teacher education. Descriptions of interdisciplinary programs were incomplete. Those program designs which could be found were not subjected to a systematic evaluation of cognitive and affective variables.

# CHAPTER III

# DESIGN OF THE STUDY

In this chapter a description is presented of the student population and sample, the experimental design, the hypotheses, and the procedure used in the data analyses.

## Population and Sample

The student population which was accessible in this experiment consisted of all undergraduate students enrolled in the second year of the two year elementary teacher education program at the University of Saskatchewan - Regina Campus, during January Semester of 1972. Before the beginning of September Semester, 1971, the majority of second year students majoring in elementary education had a choice in registering, for the September and January Semesters, in one of ten sections of blocked teaching methods classes. Most students who enrolled in a blocked section for the two semesters had the same time schedule, instructors, and class-mates for the eight required teaching methods classes. The methods classes taught were: (1) art, (2) reading, (3) language arts, (4) music, (5) health and physical education, (6) science, (7) mathematics, and (8) social studies. Traditionally each methods class within a particular blocked section was taught by an individual teacher working independently from any other subject area instructor. Classes were blocked primarily to facilitate the scheduling of student programs and for administrative convenience.

Students in a blocked section were scheduled to take three education methods classes in the September Semester and five education methods classes in the January Semester, or five teaching methods classes in the September Semester and three teaching methods classes in the January Semester. During one of the two semesters the students were enrolled in three methods classes, and in two arts and science classes of their choice. During the other semester, students attended five methods classes and experienced a period of three weeks of blocked student teaching. The organization of the second year teacher education program is outlined in Figure 1 (page 6). At the completion of the January Semester, 1972, most students registered in the second year program had completed the eight required education teaching methods classes, two elective arts and science classes, and three weeks of student teaching.

The student sample was comprised of most students enrolled in two of the ten blocked sections of teaching methods classes during the January Semester of 1972. Both sections were scheduled for teaching methods classes and a three week student teaching experience during the January Semester.

In the course of pre-registration for September Semester, 1971, students received registration information which indicated that the two sections offered methods classes which emphasized teaching techniques for primary grade teachers. Consequently most students who enrolled in either section were interested in teaching young children from kindergarten to grade three. The other three sections offering five blocked methods classes and student teaching scheduled during

January Semester, 1972, were composed almost entirely of students interested in teaching older children in elementary schools.

One section of students was arbitrarily designated as the experimental group and the other as the control group. The designation of these two sections took place due to administrative convenience.

The two semester schedule followed by the experimental and control sections is explained in Figure 2 (page 28).

The reading, language arts, health and physical education, science, music, and social studies classes were taught by the same subject area instructors in experimental and in control sections. Different teachers taught art and mathematics in the two sections. However, both sections were scheduled for three weeks of student teaching at the same time.

The experimental class was composed of three male and thirty-nine female students, whereas the control class consisted of one male and forty-two female students. The sample from these two classes used in the experiment was limited to those students who: (1) had completed three weeks of student teaching, (2) were completing the last of the eight required education teaching methods classes, (3) had completed Education 130 - Introduction to Education, and Education 120 - Educational Psychology or its equivalent arts and science class Psychology 100, and (4) had taken the pretest and two posttests included in the experimental design of the project. In addition, only students who had participated in the four day off-campus field trip were included in the experimental population. Nine of the eighty-five students in both classes were not included in the analyses of data due to the reasons stated.

FIGURE 2

OUTLINE OF SECOND YEAR PROGRAM
EXPERIMENTAL AND CONTROL GROUPS

| SEPTEMBER SEMESTER, 1971 | JANUARY SEMESTER, 1972 |
|---|---|
| **Experimental Group** | |
| 1. Education 141 - Reading | 1. Education 140 - Art |
| 2. Education 143 - Language Arts | 2. Education 145 - Social Studies |
| 3. Education 147 - Music | 3. Education 146 - Mathematics |
| *4. Arts and Science Class | 4. Education 148 - Health, PE |
| *5. Arts and Science Class | 5. Education 149 - Science |
| | 6. Three Week Student Teaching Block |
| **Control Group** | |
| 1. Education 141 - Reading | 1. Education 140 - Art |
| 2. Education 146 - Mathematics | 2. Education 143 - Language Arts |
| 3. Education 148 - Health, PE | 3. Education 145 - Social Studies |
| *4. Arts and Science Class | 4. Education 147 - Music |
| *5. Arts and Science Class | 5. Education 149 - Science |
| | 6. Three Week Student Teaching Block |

*Indicated elective classes

Experimental Design

In this research project, the writer made use of a design described by Campbell and Stanley (16:47-50) as a quasi-experimental type, and of a specific plan called the nonequivalent control group design. Campbell and Stanley (16:47) described the design as follows:

> One of the most widespread experimental designs in educational research involves an experimental group and a control group both given a pretest and a posttest, but in which the control group and the experimental group do not have pre-experimental sampling equivalence. Rather, the groups constitute naturally assembled collectives such as classrooms, as similar as availability permits but yet not so similar that one can dispense with the pretest. The assignment of the treatment to one group or the other is assumed to be random and under the experimenter's control.

The nonequivalent control group design used in the experiment is diagrammed in Figure 3.

FIGURE 3

INTERDISCIPLINARY OUTDOOR EDUCATION EXPERIMENTAL PROJECT
NONEQUIVALENT CONTROL GROUP

| | Pretest | Treatment | Posttest 1 | Posttest 2 |
|---|---|---|---|---|
| Experimental Group | $O_1$ | X | $O_2$ | $O_3$ |
| Control Group | $O_1$ | | $O_2$ | $O_3$ |

The inclusion of a second posttest in the design was made after reading the recommendations of Campbell and Stanley (16:32). They reported that "Long-range effects are greater than immediate effects for general attitudes, although weaker for specific attitudes." They

indicated that researchers should measure effects of treatment over periods of time.

Experimental controls on the effects of the extraneous variables of history, maturation, testing, and instrumentation on internal validity were applied by random registration procedures, and by the application of analysis of covariance to test scores. Since no matching procedures, selection by scores on the pre-test, or correlated measures were used, regression variables were controlled.

There were threats to external validity, frequent in this design, which were indicated by Campbell and Stanley (16:40). They were: (1) the interaction of testing and treatment, (2) the interaction of selection and treatment, and (3) reactive arrangements. It was not possible to measure the effects of testing and treatment in this experiment. The interaction of selection and treatment was controlled by the use of normal class sections and little disruption of daily routine. Reactive arrangements were minimized by maintaining a representative school program, during which no student was aware of the nature of the experiment. Furthermore, all testing and experimental treatment was administered by regular staff, a situation which increased the generalizability to ordinary classroom situations.

The pretest and posttest measurement instrument which was used in this experiment was the Education Attitude Index (Appendix A) devised by the researcher. The pretest and the two posttests were administered to the experimental group and to the control group.

The control group followed a traditional program of instruction. During the January Semester, 1972, each of the five instructors

responsible for a methods class organized his own program. Although most students in the control group were in the same art, language arts, social studies, music, and science teaching methods classes and had the same instructors and class-mates, little interdisciplinary coordination happened.

There were discussions by the instructors about interdisciplinary educational concepts in most control group methods classes; but this was as a part of subject area instruction. For example, some students selected outdoor education science field projects as an independent study program in the science education methods class. Art teaching methods instructors placed great importance on relating art to other subject areas. The amount of time spent by the instructors of teaching methods classes discussing interdisciplinary relationships varied from class to class. The individual instructor's interest was the key factor in determining the degree of emphasis on these relationships.

The schedule followed by the experimental and control groups is outlined in Figure 4.

FIGURE 4

INTERDISCIPLINARY OUTDOOR EDUCATION PROJECT SCHEDULE
JANUARY SEMESTER 1972

Monday, January 10 - Classes start

Monday, January 24 to Friday, February 11 - Student teaching

Wednesday, February 23 - Pretest

Sunday, March 12 to Wednesday, March 15 - Outdoor education experience

Friday, March 17 - Posttest #1

Monday, April 10 - Posttest #2

Wednesday, April 12 - Classes end

The experience undergone by the experimental group can be divided into three parts: (1) preparatory activities in methods classes before the four day field trip, (2) the project work itself accomplished during the field trip, and (3) the follow-up work at the university after the field trip. The focal point of the experimental project was the four day off-campus interdisciplinary outdoor education program at the Buffalo Pound Provincial Park, sixty miles from Regina.

The instructors of the five methods classes held three meetings to discuss the organization and implementation of the experimental project. One of the meetings was with the students of the experimental group. The instructors who were unfamiliar with the provincial park, took a one-half day trip to the park to study its potential for curriculum development. The attendance of the instructors at the planning meetings and on the one-half day trip varied from two to five being present.

Student participation in preparatory activities leading to the off-campus outdoor education experience was within the structure of

the regularly scheduled methods classes. The only exception to this was the single meeting between staff and students. Early in the semester the students of the experimental group were informed that they might choose to participate in a four day field trip and in that case, would need to have adequate winter clothing for the experience. This early announcement was necessary to allow students to plan their schedule for the semester. At no time during the semester were students informed of the nature of the experiment.

Each of the five education methods class instructors devoted some time, following the pretest, to preparing their students for the outdoor education experience. For example, the art instructor set apart one class period for analyzing a plan of suggested interdisciplinary activities (Appendix B) and devoted one class day to preparing materials. Three class periods in social studies were devoted to the study of area topographical maps, to the impact man makes on his physical environment, and to ideas for field studies. Skills of orienteering (map and compass games) and ideas for integrated subject area projects were developed in two mathematics teaching methods classes. The science instructor devoted one class period to a discussion of the potential offered by the area and also distributed idea sheets to his students. In the same way, three class periods were scheduled for preparation by the health-physical education instructor. The latter gave instruction in field first aid, winter dressing, the use of snowshoes and cross country skis, and survival techniques. In addition to regular classes each student received two hours of small group instruction in cross country skiing and snow shoeing. Thus, approximately thirteen hours

of formal instruction by the five methods class instructors was devoted to preparation for the trip.

The schedule (Appendix C) for the off-campus outdoor education field trip called for work, by small groups of students, on independent study projects. A student group consisted of five or six individuals. Each of these small groups made an exploratory tour of the park area and analyzed its potential for integrated curriculum development in the subject areas of art, health and physical education, mathematics, science, and social studies. Instructors acted only as advisory personnel. They gave each group the freedom to choose its own study project and encouraged the students to develop interdisciplinary projects suitable for use in the primary grades.

Student groups spent much of their project time in outdoor field study related to the interdisciplinary topic they chose. Indoor facilities were utilized mainly for the study of sketches, specimens, artifacts, and notes collected during the outdoor trips in the park area.

The culminating activity for the interdisciplinary project work of the outdoor education experience was an exhibition and demonstration period during the evening of the third day. Each group displayed its completed project work and explained its development. Students self-evaluated their project work during the demonstration but there was no grading by instructors. The evening program was attended by students and instructors, administrators from the Faculty of Education of the University of Saskatchewan-Regina Campus, and also by personnel of the Department of Natural Resources of the Province of Saskatchewan.

During the four days of the actual project there was time allowed for outdoor recreation, which provided additional occasions for communication between students and students, and between students and teachers. Evening social hours also offered the same type of opportunities for person to person interaction. All students and instructors ate meals in a common dining room. Sleeping accommodations were segregated by sex although instructors and students of the same sex shared the same facilities.

Transportation to and from the Buffalo Pound Provincial Park was provided by chartered bus. The indoor facilities of the provincial park's White Track Ski Area were used for project work, eating, and sleeping. All meals and evening snacks were furnished by the park concessionaire. All expenses incurred for meals, transportation, accommodations, and incidentals, were paid by a Faculty of Education Special Projects Grant, and by a Campus Research Grant.

After the experimental group had returned to the normal class routine of the university campus, instructors devoted some time to follow-up activities. The teachers of the art, health-physical education, and social studies classes, each spent one class hour discussing the field trip with their students, and relating it to the complete range of curriculum content studied in their teaching methods class. Mathematics and science instructors encouraged students to develop individual projects, related to the outdoor education field trip. In total, the methods class instructors devoted at least three class periods for follow-up activities and individual students were offered opportunities to devote even more time to personal project work.

Instrumentation

The Education Attitude Index (Appendix A) was developed by the researcher with the assistance of several instructors from the Faculty of Education of the University of Saskatchewan-Regina Campus. This procedure was considered most appropriate to evaluate the project, since a careful review of available measurement instruments had revealed that none were appropriate for use in this study.

The forty-four students who participated in the March, 1971, three day interdisciplinary outdoor education pilot project answered questionnaires (Appendix D) bearing on the experience. An analysis of the answers revealed that the students considered the project was of value in: (1) increasing interpersonal communications between students, (2) developing a personal and professional closeness with instructors, and (3) making relevant the educational theories related to interdisciplinary instruction in the elementary schools. The students indicated that the outdoor education experience provided a media for achieving these outcomes that was rarely found in the traditional teacher education program at the Regina Campus. A subjective analysis of student and instructor conversations by the instructors corroborated the results obtained from the student survey.

A similar questionnaire was answered by the seven university instructors who had participated in the project. In sum, the responses indicated that the instructors were in agreement with the students concerning the values of the program. All the instructors supported the development of similar programs in the future.

The information compiled from the students' and instructors'

questionnaires and from reactions from professors was used extensively in developing the Education Attitude Index. To add to this information, ninety second year elementary education students were requested to view a twenty-eight minute video tape of the March, 1971 pilot project, and to give their opinions as to what might be the antecedents, transactions, and outcomes of such a program. The opinions of the group viewing the video tape were identical to those of the students and instructors of the pilot project. This result substantiated the evaluations this writer had already obtained.

Three instructors from the Faculty of Education staff were requested to assist in the construction of an instrument to measure the desirable outcomes of the program. Their advice insured that the instrument constructed would provide the Faculty of Education with meaningful information.

Twenty-nine Regina Campus second year students in the elementary education program, who had not participated in the experimental project, completed the items of the Education Attitude Index. They were asked to evaluate it for readability, clarity, and understanding of terminology. Several instructors on the Faculty of Education also reviewed the Index. Several minor changes resulted from suggestions made by the students and staff.

A modified Likert Scale (34:5-53) was used to measure the student expressions of desired behavior. A seven point scale which allowed a greater distribution on the attitude continuum was adopted. The WORTHWHILE or DESIRABLE column and the EXISTS column are identical

seven point response scales. The response choices are as follows: (1) Always, (2) Almost Always, (3) Often, (4) Occasionally, (5) Seldom, (6) Almost Never, and (7) Never. An example of the response scale is shown below.

Sample:

| DO YOU FEEL THAT THIS SHOULD BE A WORTHWHILE OR DESIRABLE CONDITION IN AN ELEMENTARY SCHOOL IN SASKATCHEWAN. (Circle only one) | CODE FOR BOTH COLUMNS<br>1 - Always<br>2 - Almost Always<br>3 - Often<br>4 - Occasionally<br>5 - Seldom<br>6 - Almost Never<br>7 - Never | DO YOU FEEL THAT THIS CONDITION EXISTS IN THE PROFESSIONAL EDUCATION CLASSES OF THE TWO YEAR ELEMENTARY EDUCATION PROGRAM AT THE UNIVERSITY OF SASKATCHEWAN, REGINA CAMPUS. (Circle only one) |
|---|---|---|
| 1 2 3 4 5 6 7 | Individual students should be able to discuss their assignments with their teacher. | 1 2 3 4 5 6 7 |

The Education Attitude Index consisted of 24 statements about conditions which were desirable in an elementary school of the Province of Saskatchewan, and which existed in the second year elementary teacher education program at the University of Saskatchewan-Regina Campus. The 24 statements were placed in one of four concealed logical scales. The concepts measured in the four scales were: (1) Scale I (items 1-6) - The structure of the educational experience, (2) Scale II (items 7-12) - The learning environment, (3) Scale III (items 13-18) - Student to student relationships, (4) Scale IV (items 19-24) - Student and teacher relationships.

After empirical evidence, described later in this study,

supported these logical scales a score was derived from the eight sub-scales in the DESIRABLE and EXISTS columns of the index. The eight sub-scales were formed by averaging over six items each. The formula used was: Score $= \left[\frac{\Sigma X}{N}\right] 6$ with N being the number of responses out of a possible six. Some students did not answer all six items in a sub-scale which necessitated the use of the variable N in the formula. These individual sub-scale scores permitted a closer study and interpretation of the desirable aspects of educational practices in the elementary schools of the province and existing programs at the University of Saskatchewan-Regina Campus.

Content validity for the adapted Index was assumed on the following bases: (1) questionnaire and interview results from university students and instructors participating in the pilot project in March, 1971, (2) questionnaire results from students who viewed a video tape of the pilot project and were requested afterwards to establish standards for the program, and (3) the expertise of selected staff from the Faculty of Education, University of Saskatchewan-Regina Campus. Additional empirical evidence supporting the scales is described in the factor analysis procedure in Chapter IV.

The reliability of the index was checked by the test-retest method. The correlations of the pretest and first posttest sub-scales for the control group were computed and analyzed. The reliability coefficients were determined by the Pearson product-moment correlation coefficient method. The reliability coefficients obtained using this technique were conservative estimates. Limitations may have occurred because of the length of time between the pretest and posttest (twenty-three days) and the effect of instruction in education methods classes on the

students' attitudes. The reliability coefficients obtained for the pretest and posttest are shown in Figure 5.

FIGURE 5

PEARSON PRODUCT-MOMENT CORRELATION COEFFICIENT FOR EACH OF THE FOUR SCALES OF THE INDEX

| SCALE | | TWENTY-THREE DAY TIME INTERVAL | |
|---|---|---|---|
| | | DESIRABLE | EXISTS |
| I. | Structure of the Learning Experience | .45 | .60 |
| II | The Learning Environment | .60 | .20 |
| III | Student to Student Relationships | .63 | .54 |
| IV | Student and Teacher | .68 | .48 |

Data Collection

The items of the Education Attitude Index were administered by an instructor during a teaching methods class to all students in the experimental and control sections. A pretest and two posttests were given to each group (Figure 4, Page 32). Before each test the instructors gave the directions contained in the index. Students were allowed one fifty minute class period to complete the items. Forty-four students were enrolled in the experimental section and forty-three in the control section. However, five students in the experimental group were unable to attend the four day field trip; two students in the same section were late transfers from other classes and hence missed one or more of the tests; four students in the control group

missed posttest two on the last scheduled class day and efforts to contact them to obtain test results were unsuccessful; and one student in the control group did not take the pretest due to uncontrollable circumstances. Data were not considered which had been obtained from experimental group students who had not undergone the complete experience, or from students in both experimental and control groups who were unable to take a pretest or posttest. Only the data obtained from thirty-seven experimental group students and thirty-nine control group students were analyzed in the experiment.

Description of Identifying Data

The personal data requested on the Index included an identification of sex, age, cumulative grade point average, education grade point average, and approximate population of home place of residence. Both grade point averages were computed by the Faculty of Education General Office personnel. Each student received a code number to identify tests. Students were informed that only the author would have access to individual test results, which in fact, insured anonymity. This standard was adhered to throughout the experiment.

An individual's cumulative grade point average consisted of the mean score for all marks received for university classes completed by the end of September Semester, 1971. The education grade point average was the mean score of all marks received for education classes completed by the same time. Grades were scored on a five point scale with a zero being a failure and a five a superior mark. The cumulative grade point averages of all individuals in the sample population were

ranked and then the writer arbitrarily designated those scores 2.50 or above as being high and those 2.49 or below as being low.

The data on the home place of residence were arbitrarily divided into three groups: (1) rural or farm, (2) small town up to 4,999 inhabitants, and (3) cities of 5,000 or more population. Students indicated the approximate population of their home place of residence in the personal data section of the index.

Hypotheses

To investigate the relative effectiveness of the experimental interdisciplinary outdoor education program at the University of Saskatchewan-Regina Campus, the following hypotheses were tested in this study:

1. There is no significant difference between the means of the experimental and control groups on each of the eight sub-scales.
2. There is no significant difference between the means of the high cumulative grade point average group and the low cumulative grade point average group on each of the eight sub-scales.
3. There is no significant difference between the means of the three types of home place of residence on each of the eight sub-scales.
4. There is no significant interaction between treatment variable and cumulative grade point average group variable for each of the eight sub-scales.

5. There is no significant interaction between treatment variable and home place of residence group variable for each of the eight sub-scales.

The use of two posttests in the experimental design permitted an analysis to be made of both short-term and long-term differences in the dependent variables. There were twenty-three days between the first and second posttests.

Data Analyses

Test number, student identification, personal information and the responses to the forty-eight items in the two columns of the index were coded and punched on computer cards. The four scales in each of the two columns of the index formed eight sub-scores which were treated as separate dependent variables. Subjects were also classified by high or low cumulative grade point average, and farm, small town, or city place of home residence. Descriptive statistics were calculated for each sub-scale of the pretest, posttest one, and posttest two. F statistics were obtained for each sub-scale to test the five null hypotheses. Figure 6 shows the code of sub-scales used in the Education Attitude Index.

FIGURE 6

CODE FOR SUB-SCALES OF THE EDUCATION ATTITUDE INDEX

| SUB-SCALE | COLUMN | DATA DESCRIPTION |
|---|---|---|
| 1 | DESIRABLE | The structure of the educational experience |
| 2 | DESIRABLE | The learning environment |
| 3 | DESIRABLE | Student to student relationships |
| 4 | DESIRABLE | Student and teacher relationships |
| 5 | EXISTS | The structure of the educational experience |
| 6 | EXISTS | The learning environment |
| 7 | EXISTS | Student to student relationships |
| 8 | EXISTS | Student and teacher relationships |

The eight sub-scores of the index were formed by the summing of groups of six items in the scale. A score of six (6) indicated the highest favorable reaction to a scale whereas a score of forty-two (42) was the most unfavorable. The median score between a most favorable and most unfavorable response was twenty-four (24).

Four factor analyses of the instrument items were completed using the twenty-four items and four scales of the index. In each analysis a rotated factor matrix was computed. Since the four scales were developed logically during the construction of the instrument, the factor analysis technique was employed to gain empirical confirmation of the existence of the scales.

Means, standard deviations, and correlations were computed for

the eight sub-scales of the pretest and two posttests for the total sample population as well as for the experimental and control groups. The information obtained was used for an analysis of general relationships between various sets of data.

Analyses of covariance of the posttest scores were employed to statistically equate the groups based on pretest performance and to control for the lack of a true randomization procedure in the study. The mean, adjusted mean, standard deviation, and mean of covariate (pretest) were computed for each sub-scale. To determine differences between the experimental and control groups due to treatment effects, a one-way analysis of covariance was computed for each of the eight sub-scales in the pretest and two posttests. The design is illustrated in Figure 7.

FIGURE 7

DESIGN FOR THE ONE-WAY ANCOVA ON THE PRETEST AND POSTTESTS FOR EFFECT OF TREATMENT ON CONTROL AND EXPERIMENTAL GROUPS

Treatment

| Control | Experimental |
|---|---|
| N = 39 | N = 37 |

A two-way analysis of covariance was computed to investigate the effect of cumulative grade point average and the interaction between cumulative grade point average and the treatment variable. To obtain statistical parsimony and proportional cell size between initial high and low cumulative grade point students, subjects were randomly

dropped by use of a table of random numbers. A fully crossed two-way analysis of covariance procedure was used. The mean, adjusted mean, standard deviation, and mean for covariate in the pretest were obtained for each interaction. The design used is represented by Figure 8.

FIGURE 8

DESIGN FOR THE TWO-WAY ANCOVA ON THE PRETEST AND POSTTESTS FOR THE INTERACTION OF C.G.P.A. X TREATMENT

| | Treatment | | |
|---|---|---|---|
| C.G.P.A. | Control | Experimental | Total |
| High 2.50 + | N = 18 | N = 18 | 36 |
| Low 2.49 - | N = 18 | N = 18 | 36 |
| Total | 36 | 36 | 72 |

The same two-way analysis of covariance technique was used to ascertain effects due to home place of residence and the interaction between home place of residence and the treatment variable. Again subjects were randomly dropped to achieve proportional cell sizes.

FIGURE 9

DESIGN FOR THE TWO-WAY ANCOVA ON THE PRETEST AND POSTTESTS FOR THE INTERACTION OF HOME RESIDENCE X TREATMENT

| Home Residence | Treatment: Control | Treatment: Experimental | Total |
|---|---|---|---|
| Farm or Rural | N = 6 | N = 6 | 12 |
| Small Town 4,999 - | N = 11 | N = 11 | 22 |
| Large City 5,000 + | N = 13 | N = 13 | 26 |
| Total | 30 | 30 | 60 |

This chapter was written to describe the subjects, the instrument used, the methodology employed, the hypotheses, and the procedure followed in analyzing the data. The presentation and analyses of data are contained in Chapter IV.

# CHAPTER IV

## ANALYSES OF DATA

Analyses of student responses to the Education Attitude Index are presented in this chapter. Data were presented for each of the eight sub-scales included in the Index. Every question within each scale of the Index had two answer columns concerning student perceptions about selected educational practices that indicate: (1) should it be a DESIRABLE condition in an elementary school in Saskatchewan and, (2) does it EXIST in the professional education classes of the two year elementary education program at the University of Saskatchewan, Regina Campus.

Numerical values were given each response to every question in all scales of the index. Scales one (1) to four (4) were located in the DESIRABLE column. Scales five (5) to eight (8) were in the EXISTS column. Each scale consisted of the sum over six items. Items in both the DESIRABLE and EXISTS columns had assigned values as follows: 1 = Always, 2 = Almost Always, 3 = Often, 4 = Occasionally, 5 = Seldom, 6 = Almost Never, and 7 = Never. A sub-score was obtained by summarizing a total scale score over the six items in the scale. Thus, a lower total indicated answers directed toward the Always and Almost Always end of the answer scale while a higher total indicated answers directed toward the Almost Never and Never end of the answer scale. The most favorable sub-score would be six (6) and the most unfavorable

forty-two (42). Summed scores indicated the following values: average mark of Always = 6.00, average mark of Almost Always = 12.00, average mark of Often = 18.00, average mark of Occasionally = 24.00, average mark of Seldom = 30.00, average mark of Almost Never = 36.00, and average mark of Never = 42.00.

Factor Analysis

The results obtained from the sample were analyzed by using a factor analysis procedure. The Education Attitude Index was constructed using the eight logical sub-scales described in the previous paragraph. The factor analysis was an attempt to account for interrelationships of Index items in terms of underlying factors. These relationships were expressed as coefficients or loadings that are interpreted in the same way as correlation coefficients. Tables I to IV illustrated the final rotated factor matrices of the factor analysis. These matrices were tables of coefficients which show the relationships between the items of the Index and the underlying hypothetical factors. Computer Program (21) BMD03M was used.

The rotated factor matrix for the twenty-four items marked as they EXIST were in Table I. Four factors were rotated. The entries in any row-column position were factor loadings. Thus for Item 1, Factor 1, in Table I a loading of .17 indicated little or no relationship. The score .75 for Item 12, Factor 3, revealed a moderate to strong degree of relationship.

Table I, Factor 1, indicated a clustering of moderate to strong relationships between Items 13 to 18 with scores ranging from .51 to .65. Items 1 to 6 in Factor 2 had scores from .42 to .69 which

TABLE I

ROTATED FACTOR MATRIX FOR THE TWENTY-FOUR E.A.I. ITEMS
(MARKED AS EXISTS)

| Item | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|---|---|---|---|---|
| 1 | .17 | .60[b] | .16 | .13 |
| 2 | .33 | .47[b] | .20 | .32 |
| 3 | .29 | .58[b] | .09 | .26 |
| 4 | .11 | .69[b] | .18 | .13 |
| 5 | .04 | .48[b] | .20 | .16 |
| 6 | .39 | .42[b] | .23 | .22 |
| 7 | .39 | .59 | .16[c] | .14 |
| 8 | .39 | .58 | .22[c] | .15 |
| 9 | .14 | .16 | .49[c] | .21 |
| 10 | .17 | .29 | .58[c] | .34 |
| 11 | .25 | .30 | .76[c] | .21 |
| 12 | .30 | .21 | .75[c] | .14 |
| 13 | .53[a] | .10 | .18 | .23 |
| 14 | .62[a] | .25 | .30 | .18 |
| 15 | .65[a] | .27 | .18 | .20 |
| 16 | .51[a] | .15 | .11 | .31 |
| 17 | .60[a] | .32 | .15 | .40 |
| 18 | .59[a] | .34 | .21 | .29 |
| 19 | .43 | .19 | .15 | .66[d] |
| 20 | .38 | .17 | .20 | .71[d] |
| 21 | .19 | .14 | .22 | .62[d] |
| 22 | .16 | .23 | .17 | .55[d] |
| 23 | .45 | .23 | .26 | .51[d] |
| 24 | .25 | .37 | .26 | .57[d] |

[a] Items from the first scale

[b] Items from the second scale

[c] Items from the third scale

[d] Items from the fourth scale

TABLE II

ROTATED FACTOR MATRIX FOR THE TWENTY-FOUR E.A.I. ITEMS
(MARKED AS EXISTS)

| Item | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 |
|---|---|---|---|---|---|
| 1 | .24 | .63[b] | .15 | .11 | -.02 |
| 2 | .31 | .47[b] | .21 | .32 | .17 |
| 3 | .25 | .56[b] | .09 | .26 | .21 |
| 4 | .08 | .68[b] | .18 | .13 | .16 |
| 5 | .06 | .49[b] | .19 | .15 | .03 |
| 6 | .34 | .40[b] | .24 | .22 | .22 |
| 7 | .23 | .52 | .18[c] | .16 | .45 |
| 8 | .21 | .50 | .24[c] | .17 | .48 |
| 9 | .08 | .14 | .50[c] | .22 | .13 |
| 10 | .18 | .30 | .58[c] | .33 | .02 |
| 11 | .26 | .31 | .76[c] | .20 | .05 |
| 12 | .23 | .18 | .76[c] | .15 | .19 |
| 13 | .58[a] | .12 | .18 | .22 | .05 |
| 14 | .57[a] | .23 | .31 | .18 | .27 |
| 15 | .53[a] | .22 | .20 | .22 | .39 |
| 16 | .58[a] | .18 | .11 | .30 | -.002 |
| 17 | .56[a] | .31 | .16 | .40 | .23 |
| 18 | .45[a] | .28 | .22 | .31 | .42 |
| 19 | .35 | .16 | .17 | .67[d] | .25 |
| 20 | .26 | .12 | .21 | .72[d] | .30 |
| 21 | .22 | .16 | .22 | .62[d] | -.02 |
| 22 | .22 | .27 | .16 | .53[d] | -.08 |
| 23 | .32 | .18 | .28 | .53[d] | .34 |
| 24 | .17 | .35 | .28 | .58[d] | .21 |

[a] Items from the first scale

[b] Items from the second scale

[c] Items from the third scale

[d] Items from the fourth scale

TABLE III

ROTATED FACTOR MATRIX FOR THE TWENTY-FOUR E.A.I. ITEMS
(MARKED AS DESIRABLE)

| Item | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|---|---|---|---|---|
| 1 | .03 | .21 | .56 [c] | .17 |
| 2 | .24 | .23 | .44 [c] | .24 |
| 3 | .16 | .01 | .63 [c] | .08 |
| 4 | .20 | .11 | .44 [c] | .30 |
| 5 | .15 | .17 | .47 [c] | .02 |
| 6 | .23 | .28 | .43 [c] | .17 |
| 7 | .23 | .10 [b] | .08 | .61 |
| 8 | .25 | .34 [b] | .28 | .49 |
| 9 | .08 | .32 [b] | .33 | .30 |
| 10 | .14 | .59 [b] | .21 | .24 |
| 11 | .13 | .74 [b] | .29 | .15 |
| 12 | .27 | .72 [b] | .14 | .17 |
| 13 | .59 | .07 | .12 | .20 [d] |
| 14 | .51 | .06 | .25 | .20 [d] |
| 15 | .42 | .16 | .38 | .16 [d] |
| 16 | .30 | .15 | .30 | .23 [d] |
| 17 | .38 | .26 | .42 | .31 [d] |
| 18 | .20 | .18 | .19 | .54 [d] |
| 19 | .56 [a] | .34 | .07 | .19 |
| 20 | .61 [a] | .40 | .24 | .16 |
| 21 | .47 [a] | .50 | .19 | .06 |
| 22 | .35 [a] | .27 | .40 | .12 |
| 23 | .45 [a] | .15 | .17 | .40 |
| 24 | .40 [a] | .20 | .22 | .35 |

[a] Items from the first scale

[b] Items from the second scale

[c] Items from the third scale

[d] Items from the fourth scale

TABLE IV

ROTATED FACTOR MATRIX FOR THE TWENTY-FOUR E.A.I. ITEMS (MARKED AS DESIRABLE)

| Item | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 |
|---|---|---|---|---|---|
| 1 | .05 | .21 | .60 [c] | .13 | .07 |
| 2 | .23 | .23 | .43 [c] | .21 | .19 |
| 3 | .11 | .02 | .58 [c] | .03 | .29 |
| 4 | .22 | .10 | .52 [c] | .28 | .04 |
| 5 | .08 | .19 | .35 [c] | -.03 | .36 |
| 6 | .20 | .29 | .37 [c] | .13 | .27 |
| 7 | .23 | .10 [b] | .12 | .60 | .05 |
| 8 | .27 | .34 [b] | .31 | .47 | .10 |
| 9 | .04 | .34 [b] | .23 | .27 | .29 |
| 10 | .14 | .59 [b] | .15 | .21 | .18 |
| 11 | .15 | .74 [b] | .23 | .11 | .18 |
| 12 | .31 | .71 [b] | .13 | .15 | .07 |
| 13 | .55 | .05 | .08 | .18 | .25 [d] |
| 14 | .44 | .05 | .16 | .17 | .35 [d] |
| 15 | .33 | .17 | .21 | .12 | .50 [d] |
| 16 | .23 | .16 | .17 | .19 | .39 [d] |
| 17 | .32 | .26 | .31 | .27 | .41 [d] |
| 18 | .12 | .20 | .08 | .51 | .37 [d] |
| 19 | .59 [a] | .30 | .10 | .18 | .06 |
| 20 | .62 [a] | .37 | .24 | .14 | .16 |
| 21 | .49 [a] | .47 | .18 | .04 | .12 |
| 22 | .35 [a] | .25 | .41 | .09 | .15 |
| 23 | .44 [a] | .13 | .18 | .39 | .14 |
| 24 | .41 [a] | .18 | .25 | .33 | .11 |

[a] Items from the first scale

[b] Items from the second scale

[c] Items from the third scale

[d] Items from the fourth scale

indicated similar relationships. Factor loadings of .49 to .76 for Items 9 to 12 of Factor 3 and .51 to .71 for Items 19 to 24 of Factor 4, showed moderate to strong relationships. Except for items seven and eight, which logically should have loaded on factor three, this rotation gave empirical confirmation of the logical basis used to construct the items of the Index.

With some exceptions clustering of factors in Table II, Table III, and Table IV also tended to substantiate the logic that the columns of the factor matrix did contain hypothetical variables which could be used as sub-scales. These tables differed in the item responses used (EXISTS vs. DESIRABLE) and in the number of factors rotated. The EXISTS in the professional education classes of the two year elementary education program in Tables I and II and the should be a worthwhile or DESIRABLE condition in an elementary school in Tables III and IV, protrayed the two columns of the Index. Tables I and III indicated a rotation of four factors. Table II and Table IV represented an attempt to further clarify relationships by rotating five factors.

Descriptive Statistics

Descriptive statistics were computed for each of the independent variables. Means and standard deviations were obtained for the sex, age, cumulative grade point average, education grade point average, and home place of residence for all subjects. Means and standard deviations were collected for the eight sub-scores for each of the three tests: the pretest, posttest one, and posttest two.

Table V indicated the means and standard deviations of the

TABLE V

MEANS AND STANDARD DEVIATIONS
OF EXPERIMENTAL GROUP

| Variable | Number | Mean | Std. Dev. |
|---|---|---|---|
| 1. Sex | 37 | 1.95 | .23 |
| 2. Age | 37 | 20.78 | 5.02 |
| 3. C.G.P.A. | 37 | 2.61 | .49 |
| 4. E.G.P.A. | 37 | 2.96 | .59 |
| 5. Home | 37 | 2.16 | .73 |
| 6. Pretest 1, Sub-scale 1 | 37 | 13.70 | 3.24 |
| 7. Pretest 1, Sub-scale 2 | 37 | 14.00 | 3.65 |
| 8. Pretest 1, Sub-scale 3 | 37 | 13.29 | 3.59 |
| 9. Pretest 1, Sub-scale 4 | 37 | 12.35 | 3.49 |
| 10. Pretest 1, Sub-scale 5 | 37 | 27.13 | 4.72 |
| 11. Pretest 1, Sub-scale 6 | 37 | 26.32 | 5.95 |
| 12. Pretest 1, Sub-scale 7 | 37 | 25.35 | 5.91 |
| 13. Pretest 1, Sub-scale 8 | 37 | 22.57 | 5.49 |
| 14. Posttest 1, Sub-scale 1 | 37 | 13.76 | 3.37 |
| 15. Posttest 1, Sub-scale 2 | 37 | 12.78 | 3.40 |
| 16. Posttest 1, Sub-scale 3 | 37 | 12.76 | 3.93 |
| 17. Posttest 1, Sub-scale 4 | 37 | 11.59 | 3.97 |
| 18. Posttest 1, Sub-scale 5 | 37 | 25.57 | 4.59 |
| 19. Posttest 1, Sub-scale 6 | 37 | 24.24 | 5.65 |
| 20. Posttest 1, Sub-scale 7 | 37 | 24.41 | 5.04 |
| 21. Posttest 1, Sub-scale 8 | 37 | 21.68 | 5.78 |
| 22. Posttest 2, Sub-scale 1 | 37 | 11.65 | 3.38 |
| 23. Posttest 2, Sub-scale 2 | 37 | 11.24 | 3.28 |
| 24. Posttest 2, Sub-scale 3 | 37 | 10.97 | 2.94 |
| 25. Posttest 2, Sub-scale 4 | 37 | 10.38 | 3.58 |
| 26. Posttest 2, Sub-scale 5 | 37 | 26.43 | 4.79 |
| 27. Posttest 2, Sub-scale 6 | 37 | 26.11 | 5.63 |
| 28. Posttest 2, Sub-scale 7 | 37 | 25.14 | 5.30 |
| 29. Posttest 2, Sub-scale 8 | 37 | 22.51 | 6.31 |

TABLE VI

MEANS AND STANDARD DEVIATIONS
OF CONTROL GROUP

| Variable | Number | Mean | Std. Dev. |
|---|---|---|---|
| 1. Sex | 39 | 2.00 | .00 |
| 2. Age | 39 | 21.33 | 3.45 |
| 3. C.G.P.A. | 39 | 2.66 | .68 |
| 4. E.G.P.A. | 39 | 3.13 | .66 |
| 5. Home | 39 | 2.41 | .75 |
| 6. Pretest 1, Sub-scale 1 | 39 | 11.78 | 3.67 |
| 7. Pretest 1, Sub-scale 2 | 39 | 11.91 | 3.76 |
| 8. Pretest 1, Sub-scale 3 | 39 | 11.04 | 3.05 |
| 9. Pretest 1, Sub-scale 4 | 39 | 11.08 | 3.97 |
| 10. Pretest 1, Sub-scale 5 | 39 | 25.76 | 5.28 |
| 11. Pretest 1, Sub-scale 6 | 39 | 28.62 | 4.74 |
| 12. Pretest 1, Sub-scale 7 | 39 | 24.85 | 5.69 |
| 13. Pretest 1, Sub-scale 8 | 39 | 23.51 | 5.01 |
| 14. Posttest 1, Sub-scale 1 | 39 | 11.67 | 3.54 |
| 15. Posttest 1, Sub-scale 2 | 39 | 11.64 | 3.92 |
| 16. Posttest 1, Sub-scale 3 | 39 | 10.92 | 3.77 |
| 17. Posttest 1, Sub-scale 4 | 39 | 11.26 | 3.80 |
| 18. Posttest 1, Sub-scale 5 | 39 | 27.76 | 6.29 |
| 19. Posttest 1, Sub-scale 6 | 39 | 28.81 | 6.36 |
| 20. Posttest 1, Sub-scale 7 | 39 | 26.05 | 6.57 |
| 21. Posttest 1, Sub-scale 8 | 39 | 25.58 | 5.86 |
| 22. Posttest 2, Sub-scale 1 | 39 | 11.55 | 4.01 |
| 23. Posttest 2, Sub-scale 2 | 39 | 11.92 | 4.06 |
| 24. Posttest 2, Sub-scale 3 | 39 | 10.87 | 3.46 |
| 25. Posttest 2, Sub-scale 4 | 39 | 10.31 | 3.55 |
| 26. Posttest 2, Sub-scale 5 | 39 | 28.47 | 6.12 |
| 27. Posttest 2, Sub-scale 6 | 39 | 29.62 | 5.78 |
| 28. Posttest 2, Sub-scale 7 | 39 | 27.26 | 6.69 |
| 29. Posttest 2, Sub-scale 8 | 39 | 26.46 | 6.27 |

experimental group and Table VI gave the same information for the control group. Appendix E illustrated the identical information for the total group of the sample of the study. Figure 10 clarified the distribution of subjects in the experimental and control groups by sex and home place of residence which were dichotomous and ordinal variables respectively. For example sub-scores one (1) to four (4) for all three tests indicated both experimental and control groups range closest to Almost Always for the items being a DESIRABLE condition in an elementary school in Saskatchewan.

FIGURE 10

SAMPLE POPULATION
EXPERIMENTAL AND CONTROL GROUPS
SEX AND HOME PLACE OF RESIDENCE

| | SEX | | HOME PLACE OF RESIDENCE | | |
|---|---|---|---|---|---|
| | Male | Female | Farm-Rural | Small Town | Large City |
| Experimental | 1 | 36 | 7 | 17 | 13 |
| Control | 0 | 39 | 6 | 11 | 22 |
| Total | 1 | 75 | 13 | 28 | 35 |

Analysis of Mean Differences and Interactions

A one-way analysis of covariance was used to determine if there was a significant difference between the mean level of the dependent variable (posttests) of the students who were in the control group

from the mean level of students who were in the experimental group with the pretest used as a covariate. The main effects tested by the two-way analyses of covariance included: (1) Treatment, (2) Cumulative Grade Point Average, and (3) Home Place of Residence. The BMD05V (21:1-15) analysis of covariance program at the University of Wyoming Computer Center was used in processing data. The covariance model enables a researcher to statistically equate intact groups on the covariants where randomization was not possible.

A two-way analysis of covariance using the appropriate pretest as the covariate tested the interactions of other independent variables on posttest scores. Cumulative grade point average and home place of residence were each crossed with treatment in two-way analyses. The dependent variable for each analysis was a posttest score. These analyses allowed investigation of the effect of each independent variable and interactions of combinations of those variables on the dependent variable. Additionally Campbell and Stanley (16:23) stated that statistical controls were obtained through covariance techniques.

The F statistics calculated for the one-way design used in this study indicated the significance of the treatment compared to the control conditions. The F statistics computed for the two-way designs revealed the interactions of the treatment variable with the independent variables of cumulative grade point average and home place of residence. Additional significance tests were made on the effects of grade point average, home place of residence, and again on the treatment variable. All F statistics were compared with a critical value which indicated significance at the .05 level.

Analyses of Covariance Tables

A series of one-way and two-way analyses of covariance were used to test hypotheses one to five. Tables VII and XXXVIII provided data for the analyses of covariance that address hypothesis one. Descriptive statistics and a one-way analysis of covariance were computed for each of the eight sub-scales of posttest one and posttest two.

Table VII contained the descriptive statistics for posttest one, sub-scale one. Columns one and two identified the experimental group and the control group. The experimental group participated in the interdisciplinary outdoor education project and hence received the treatment. The number column identified the number of subjects (37) in the experimental group and the number (39) in the control group. Column four indicated the mean score received by each group for posttest one, sub-scale one. The experimental group had a mean of 13.76 and the control group a mean of 11.67. Column five referred to the adjusted mean of the original posttest one, sub-scale one for each group, which was calculated by applying the analysis of covariance technique. The adjusted mean of the experimental group was 13.31. The control group's adjusted mean was 12.09. The standard deviations of the unadjusted original scores were 3.37 for the experimental group and 3.54 for the control group, and were located in column six. The last column listed the mean of the covariate, which in this table was the pretest on sub-scale one. The experimental group received a mean on the pretest of 13.70 and the control group 11.78.

The information contained in Table VIII indicated the test for

TABLE VII

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 1, SCALE 1

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 13.76 | 13.31 | 3.37 | 13.70 |
| (C)* | No Treatment | 39 | 11.67 | 12.09 | 3.54 | 11.78 |

*(E) = Experimental Group (C) = Control Group

TABLE VIII

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 1, SCALE 1

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 26.60 | 26.60 | 2.75 |
| Error | 73 | 706.35 | 9.68 | |

$F_{1,73,.05} = 3.98$

TABLE IX

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 1, SCALE 2

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 12.78 | 12.24 | 3.40 | 14.00 |
| (C)* | No Treatment | 39 | 11.64 | 12.15 | 3.92 | |

*(E) = Experimental Group (C) = Control Group

TABLE X

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 1, SCALE 2

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | .14 | .14 | .014 |
| Error | 73 | 742.27 | 10.17 | |

$F_{1,73,.05} = 3.98$

TABLE XI

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 1, SCALE 3

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 12.76 | 11.97 | 3.93 | 13.29 |
| (C)* | No Treatment | 39 | 10.92 | 11.66 | 3.77 | 11.04 |

*(E) = Experimental Group (C) = Control Group

TABLE XII

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 1, SCALE 3

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 1.63 | 1.63 | .17 |
| Error | 73 | 717.78 | 9.83 | |

$F_{1,73,.05} = 3.98$

TABLE XIII

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 1, SCALE 4

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 11.59 | 11.13 | 3.97 | 12.35 |
| (C)* | No Treatment | 39 | 11.26 | 11.70 | 3.80 | 11.08 |

*(E) = Experimental Group (C) = Control Group

TABLE XIV

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 1, SCALE 4

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 6.01 | 6.01 | .73 |
| Error | 73 | 599.68 | 8.21 | |

$F_{1,73,.05} = 3.98$

TABLE XV

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 1, SCALE 5

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 25.57 | 25.18 | 4.59 | 27.14 |
| (C)* | No Treatment | 39 | 27.76 | 28.12 | 6.29 | 25.78 |

*(E) = Experimental Group (C) = Control Group

TABLE XVI

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 1, SCALE 5

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 161.11 | 161.11 | 6.87* |
| Error | 73 | 1711.00 | 23.44 | |

*Significant at the .05 level; $F_{1,73,.05} = 3.98$

**TABLE XVII**

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 1, SCALE 6

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 24.24 | 24.83 | 5.65 | 26.32 |
| (C)* | No Treatment | 39 | 28.81 | 28.25 | 6.36 | 28.62 |

*(E) = Experimental Group (C) = Control Group

**TABLE XVIII**

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 1, SCALE 6

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 212.29 | 212.29 | 7.19* |
| Error | 73 | 2156.58 | 29.54 | |

*Significant at the .05 level; $F_{1,73,.05} = 3.98$

TABLE XIX

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 1, SCALE 7

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 24.41 | 24.27 | 5.04 | 25.35 |
| (C)* | No Treatment | 39 | 26.05 | 26.18 | 6.57 | 24.85 |

*(E) = Experimental Group (C) = Control Group

TABLE XX

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 1, SCALE 7

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 69.18 | 69.18 | 2.73 |
| Error | 73 | 1852.48 | 25.38 | |

$F_{1,73,.05} = 3.98$

TABLE XXI

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 1, SCALE 8

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 21.68 | 21.91 | 5.78 | 22.57 |
| (C)* | No Treatment | 39 | 25.58 | 25.36 | 5.86 | 23.51 |

*(E) = Experimental Group (C) = Control Group

TABLE XXII

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 1, SCALE 8

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 224.02 | 224.02 | 8.09* |
| Error | 73 | 2022.09 | 27.70 | |

*Significant at the .05 level; $F_{1,73,.05} = 3.98$

TABLE XXIII

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 2, SCALE 1

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 11.65 | 11.08 | 3.38 | 13.70 |
| (C)* | No Treatment | 39 | 11.55 | 12.09 | 4.01 | 11.78 |

*(E) = Experimental Group (C) = Control Group

TABLE XXIV

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 2, SCALE 1

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 17.91 | 17.91 | 1.81 |
| Error | 73 | 722.56 | 9.90 | |

$F_{1,73,.05} = 3.98$

TABLE XXV

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 2, SCALE 2

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 11.24 | 10.70 | 3.28 | 14.00 |
| (C)* | No Treatment | 39 | 11.92 | 12.44 | 4.06 | 11.91 |

*(E) = Experimental Group (C) = Control Group

TABLE XXVI

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 2, SCALE 2

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 53.24 | 53.24 | 5.18 * |
| Error | 73 | 750.38 | 10.28 | |

*Significant at the .05 level; $F_{1,73,.05} = 3.98$

TABLE XXVII

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 2, SCALE 3

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 10.97 | 10.34 | 2.94 | 13.29 |
| (C)* | No Treatment | 39 | 10.87 | 11.47 | 3.46 | 11.04 |

*(E) = Experimental Group (C) = Control Group

TABLE XXVIII

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 2, SCALE 3

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 21.82 | 21.82 | 3.07 |
| Error | 73 | 518.78 | 7.11 | |

$F_{1,73,.05} = 3.98$

TABLE XXIX

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 2, SCALE 4

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 10.38 | 10.56 | 3.58 | 12.35 |
| (C)* | No Treatment | 39 | 10.31 | 10.61 | 3.55 | 11.08 |

*(E) = Experimental Group (C) = Control Group

TABLE XXX

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 2, SCALE 4

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 5.73 | 5.73 | .61 |
| Error | 73 | 687.11 | 9.41 | |

$F_{1, 73, .05} = 3.98$

TABLE XXXI

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 2, SCALE 5

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 26.43 | 26.16 | 4.79 | 27.14 |
| (C)* | No Treatment | 39 | 28.47 | 28.73 | 6.12 | 25.76 |

*(E) = Experimental Group (C) = Control Group

TABLE XXXII

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 2, SCALE 5

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 123.45 | 123.45 | 4.59* |
| Error | 73 | 1963.07 | 26.89 | |

*Significant at the .05 level; $F_{1,73,.05} = 3.98$

TABLE XXXIII

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 2, SCALE 6

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 26.11 | 26.59 | 5.63 | 26.33 |
| (C)* | No Treatment | 39 | 29.62 | 29.16 | 5.78 | 28.62 |

*(E) = Experimental Group (C) = Control Group

TABLE XXXIV

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 2, SCALE 6

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 119.38 | 119.38 | 4.26* |
| Error | 73 | 2046.84 | 28.04 | |

*Significant at the .05 level; $F_{1,73,.05} = 3.98$

TABLE XXXV

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 2, SCALE 7

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 25.14 | 25.03 | 5.30 | 25.35 |
| (C)* | No Treatment | 39 | 27.26 | 27.36 | 6.69 | 24.85 |

*(E) = Experimental Group (C) = Control Group

TABLE XXXVI

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 2, SCALE 7

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 102.64 | 102.64 | 3.25 |
| Error | 73 | 2307.96 | 31.62 | |

$F_{1,73,.05} = 3.98$

TABLE XXXVII

DESCRIPTIVE STATISTICS
ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT)
POSTTEST 2, SCALE 8

| Treatment Group | Variable | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Treatment | 37 | 22.51 | 22.73 | 6.31 | 22.57 |
| (C)* | No Treatment | 39 | 26.46 | 26.25 | 6.27 | 23.51 |

*(E) = Experimental Group (C) = Control Group

TABLE XXXVIII

ONE-WAY ANALYSIS OF COVARIANCE (TREATMENT) OF
POSTTEST 2, SCALE 8

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 233.40 | 233.40 | 6.80 * |
| Error | 73 | 2504.14 | 34.30 | |

*Significant at the .05 level; $F_{1,73,.05} = 3.98$

differences that might exist between the means of the experimental and control groups on posttest one, sub-scale one as a result of the treatment effect. Column one identified the sources of variation, treatment effect, and the within cell error variation. The abbreviation d. f. indicated degrees of freedom and was used in column two. The treatment has one degree of freedom and the error has seventy-three. Column three was the sums of squares (S.S), and column four the mean squares (M.S.). In posttest one, sub-scale one, the sum of the square value for the treatment was 26.60 and 706.35 for the error. The mean squared value for the treatment was 26.60 and 9.68 for the error. Column five gave the F statistic which is used to test for significant difference between the experimental and control group adjusted means on posttest one, sub-scale one. An obtained $F_{1,73,.05}$ value of 3.98 or larger would reveal a significant difference at the .05 level attributable to the treatment effect.

Tables VII to XXXIX referred to the one-way analysis of covariance technique used in this study for the eight dependent variables (sub-scales), and measured for both short-term (posttest one) and long-term (posttest two) effects. They contained data which was used in testing hypothesis one.

Two-way analyses of covariance were used to test hypotheses two, three, four, and five. Tables XXXIX to CII contain data for the analysis of covariance of these four hypotheses. Each of the eight sub-scales of posttest one and posttest two had descriptive statistics and a two-way analysis of covariance computed. Tables XXXIX to LXX are two-way analyses of covariance between the independent variables of

cumulative grade point average classification group and the treatment of the interdisciplinary outdoor education experience. Tables LXXI to CII refer to the two-way analysis of covariance between the independent variables of home place of residence and the treatment effect. Both sets of tables may be interpreted in the same manner.

Descriptive statistics for posttest one, sub-scale one, are in Table XXXIX. Columns one and two indicated the characteristics of the subjects in each of the cells of the two-way fully crossed analysis of covariance design used in this study. The criteria for distinguishing between experimental and control groups, and high cumulative and low cumulative grade point averages are contained in Chapter III. Column three indicated that eighteen students were included in each of the four cells. The mean score received by each group of eighteen students for posttest one, scale one was listed in column four. These means ranged from 11.44 for the control group with a high cumulative grade point average to 14.56 for the experimental group with a low cumulative grade point average. The adjusted means of column five were calculated by the analysis of covariance technique. The standard deviations of the original unadjusted scores were located in column six. Finally column seven contained the means of the covariate, which was the pretest in this experiment. These ranged between 11.54 and 14.00.

Column one of Table XL listed the main effects, interactions, and error which were sources of variation in the analysis of covariance. The main effects were treatment and cumulative grade point average classification group. The interaction measured was between the treatment and cumulative grade point average. The degrees of freedom (d.f.)

TABLE XXXIX

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P A. - POSTTEST 1, SCALE 1

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 13.22 | 12.91 | 2.46 | 13.50 |
| (E) | Low | 18 | 14.56 | 14.02 | 3.96 | 14.00 |
| (C)* | High | 18 | 11.44 | 11.99 | 3.20 | 11.54 |
| (C) | Low | 18 | 12.44 | 12.74 | 3.79 | 12.10 |

*(E) = Experimental Group (C) = Control Group

TABLE XL

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 1, SCALE 1

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 20.04 | 20.04 | 2.14 |
| C.G.P.A. | 1 | 15.62 | 15.62 | 1.68 |
| T X C.G.P.A. | 1 | .57 | .57 | .06 |
| Error | 67 | 624.65 | 9.32 | |

$F_{1,67,.05} = 3.99$

TABLE XLI

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 1, SCALE 2

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 12.11 | 12.09 | 2.60 | 13.11 |
| (E) | Low | 18 | 13.56 | 12.65 | 4.05 | 15.00 |
| (C)* | High | 18 | 10.89 | 11.39 | 3.71 | 12.00 |
| (C) | Low | 18 | 12.89 | 13.32 | 3.97 | 12.14 |

*(E) = Experimental Group (C) = Control Group

TABLE XLII

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 1, SCALE 2

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | -.008 | -.008 | -.0007 |
| C.G.P.A. | 1 | 27.34 | 27.34 | 2.67 |
| T X C.G.P.A. | 1 | 8.38 | 8.38 | .817 |
| Error | 67 | 687.20 | 10.26 | |

$F_{1,67,.05} = 3.99$

TABLE XLIII

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 1, SCALE 3

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 12.00 | 12.18 | 2.66 | 11.94 |
| (E) | Low | 18 | 13.56 | 11.97 | 4.93 | 14.53 |
| (C)* | High | 18 | 11.33 | 11.93 | 4.30 | 11.33 |
| (C) | Low | 18 | 10.94 | 11.75 | 3.44 | 11.03 |

*(E) = Experimental Group (C) = Control Group

TABLE XLIV

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 1, SCALE 3

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | .87 | .87 | .08 |
| C.G.P.A. | 1 | .70 | .70 | .07 |
| T X C.G.P.A. | 1 | .01 | .01 | .001 |
| Error | 67 | 704.24 | 10.51 | |

$F_{1,67,.05} = 3.99$

TABLE XLV

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 1, SCALE 4

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 10.83 | 11.23 | 3.07 | 11.22 |
| (E) | Low | 18 | 12.49 | 11.33 | 4.70 | 13.44 |
| (C)* | High | 18 | 11.17 | 11.45 | 4.13 | 11.39 |
| (C) | Low | 18 | 11.73 | 12.21 | 3.63 | 11.11 |

*(E) = Experimental Group (C) = Control Group

TABLE XLVI

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 1, SCALE 4

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 5.34 | 5.34 | .63 |
| C.G.P.A. | 1 | 3.23 | 3.23 | .38 |
| T X C.G.P.A. | 1 | 1.95 | 1.95 | .23 |
| Error | 67 | 570.02 | 8.51 | |

$F_{1,67,.05} = 3.99$

TABLE XLVII

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 1, SCALE 5

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 26.72 | 25.82 | 4.36 | 28.06 |
| (E) | Low | 18 | 24.72 | 24.82 | 4.11 | 26.17 |
| (C)* | High | 18 | 28.50 | 28.63 | 6.68 | 26.11 |
| (C) | Low | 18 | 26.87 | 27.54 | 5.29 | 25.09 |

*(E) = Experimental Group (C) = Control Group

TABLE XLVIII

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 1, SCALE 5

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 133.96 | 133.96 | 6.27* |
| C.G.P.A. | 1 | 19.34 | 19.34 | .90 |
| T X C.G.P.A. | 1 | .04 | .04 | .001 |
| Error | 67 | 1431.73 | 21.37 | |

* Significant at the .05 level; $F_{1,67,.05} = 3.99$

TABLE XLIX

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 1, SCALE 6

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 25.50 | 25.17 | 6.23 | 27.94 |
| (E) | Low | 18 | 23.17 | 24.59 | 5.03 | 24.50 |
| (C)* | High | 18 | 29.64 | 29.34 | 6.78 | 27.89 |
| (C) | Low | 18 | 27.50 | 26.72 | 5.69 | 28.83 |

*(E) = Experimental Group (C) = Control Group

TABLE L

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 1, SCALE 6

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 171.50 | 171.50 | 5.99* |
| C.G.P.A. | 1 | 45.62 | 45.62 | 1.59 |
| T X C.G.P.A. | 1 | 17.96 | 17.96 | .63 |
| Error | 67 | 1918.50 | 28.63 | |

* Significant at the .05 level; $F_{1,67,.05} = 3.99$

TABLE LI

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 1, SCALE 7

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 25.83 | 24.84 | 4.84 | 27.11 |
| (E) | Low | 18 | 22.83 | 23.74 | 5.02 | 23.50 |
| (C)* | High | 18 | 26.50 | 26.03 | 6.30 | 26.11 |
| (C) | Low | 18 | 25.50 | 26.06 | 6.56 | 24.17 |

*(E) = Experimental Group (C) = Control Group

TABLE LII

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 1, SCALE 7

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 55.32 | 55.32 | 2.32 |
| C.G.P.A. | 1 | 4.84 | 4.84 | .20 |
| T X C.G.P.A. | 1 | 5.58 | 5.58 | .23 |
| Error | 67 | 1600.09 | 23.88 | |

$F_{1,67,.05} = 3.99$

TABLE LIII

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 1, SCALE 8

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 23.83 | 23.53 | 5.79 | 23.67 |
| (E) | Low | 18 | 19.61 | 20.23 | 5.26 | 21.28 |
| (C)* | High | 18 | 26.80 | 26.32 | 6.28 | 24.11 |
| (C) | Low | 18 | 24.24 | 24.41 | 4.27 | 22.43 |

*(E) = Experimental Group (C) = Control Group

TABLE LIV

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 1, SCALE 8

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 217.95 | 217.95 | 8.35* |
| C.G.P.A. | 1 | 117.14 | 117.14 | 4.49* |
| T X C.G.P.A. | 1 | 8.71 | 8.71 | .33 |
| Error | 67 | 1748.00 | 26.09 | |

* Significant at the .05 level; $F_{1,67,.05} = 3.99$

TABLE LV

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 2, SCALE 1

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 12.22 | 11.82 | 2.76 | 13.50 |
| (E) | Low | 18 | 11.40 | 10.71 | 3.78 | 14.00 |
| (C)* | High | 18 | 10.78 | 11.48 | 4.19 | 11.54 |
| (C) | Low | 18 | 12.74 | 13.13 | 3.78 | 12.10 |

*(E) = Experimental Group (C) = Control Group

TABLE LVI

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 2, SCALE 1

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 18.07 | 18.07 | 1.88 |
| C.G.P.A. | 1 | 1.34 | 1.34 | .14 |
| T X C.G.P.A. | 1 | 34.21 | 34.21 | 3.57 |
| Error | 67 | 642.76 | 9.59 | |

$F_{1,67,.05} = 3.99$

TABLE LVII

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 2, SCALE 2

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 11.28 | 11.25 | 3.08 | 13.11 |
| (E) | Low | 18 | 11.33 | 10.37 | 3.60 | 15.00 |
| (C)* | High | 18 | 11.72 | 12.25 | 4.27 | 12.00 |
| (C) | Low | 18 | 12.78 | 13.23 | 3.78 | 12.14 |

*(E) = Experimental Group (C) = Control Group

TABLE LVIII

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 2, SCALE 2

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 62.16 | 62.16 | 5.93* |
| C.G.P.A. | 1 | .05 | .05 | .004 |
| T X C.G.P.A. | 1 | 15.41 | 15.41 | 1.47 |
| Error | 67 | 702.44 | 10.48 | |

* Significant at the .05 level; $F_{1,67,.05} = 3.99$

TABLE LIX

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 2, SCALE 3

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 10.83 | 10.99 | 2.46 | 11.94 |
| (E) | Low | 18 | 11.28 | 9.92 | 3.40 | 14.53 |
| (C)* | High | 18 | 10.50 | 11.01 | 3.11 | 11.33 |
| (C) | Low | 18 | 11.61 | 12.30 | 3.90 | 11.03 |

*(E) = Experimental Group (C) = Control Group

TABLE LX

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 2, SCALE 3

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 23.55 | 23.55 | 3.34 |
| C.G.P.A. | 1 | .20 | .20 | .03 |
| T X C.G.P.A. | 1 | 23.75 | 23.75 | 3.37 |
| Error | 67 | 472.23 | 7.05 | |

$F_{1,67,.05} = 3.99$

TABLE LXI

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 2, SCALE 4

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 10.33 | 10.62 | 3.31 | 11.22 |
| (E) | Low | 18 | 10.61 | 9.78 | 3.93 | 13.44 |
| (C)* | High | 18 | 10.33 | 10.54 | 3.55 | 11.39 |
| (C) | Low | 18 | 10.56 | 10.90 | 3.79 | 11.11 |

*(E) = Experimental Group (C) = Control Group

TABLE LXII

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 2, SCALE 4

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 4.72 | 4.72 | .48 |
| C.G.P.A. | 1 | 1.02 | 1.02 | .10 |
| T X C.G.P.A. | 1 | 6.34 | 6.34 | .64 |
| Error | 67 | 660.28 | 9.85 | |

$F_{1,67,.05} = 3.99$

TABLE LXIII

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 2, SCALE 5

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 27.89 | 27.26 | 4.34 | 28.06 |
| (E) | Low | 18 | 25.56 | 25.62 | 4.50 | 26.17 |
| (C)* | High | 18 | 29.50 | 29.59 | 6.18 | 26.11 |
| (C) | Low | 18 | 27.29 | 27.75 | 6.14 | 25.09 |

*(E) = Experimental Group (C) = Control Group

TABLE LXIV

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 2, SCALE 5

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 87.27 | 87.27 | 3.41 |
| C.G.P.A. | 1 | 53.16 | 53.16 | 2.08 |
| T X C.G.P.A. | 1 | .16 | .16 | .006 |
| Error | 67 | 1715.54 | 25.61 | |

$F_{1,67,.05} = 3.99$

TABLE LXV

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 2, SCALE 6

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 26.44 | 26.16 | 5.77 | 27.94 |
| (E) | Low | 18 | 26.11 | 27.32 | 5.60 | 25.50 |
| (C)* | High | 18 | 31.28 | 31.01 | 4.82 | 27.89 |
| (C) | Low | 18 | 27.39 | 26.71 | 5.28 | 28.83 |

*(E) = Experimental Group (C) = Control Group

TABLE LXVI

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 2, SCALE 6

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 78.14 | 78.14 | 3.27 |
| C.G.P.A. | 1 | 43.66 | 43.66 | 1.83 |
| T X C.G.P.A. | 1 | 128.52 | 128.52 | 5.38* |
| Error | 67 | 1601.90 | 23.91 | |

* Significant at the .05 level; $F_{1,67,.05} = 3.99$

TABLE LXVII

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 2, SCALE 7

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 26.50 | 25.84 | 5.27 | 27.11 |
| (E) | Low | 18 | 24.11 | 24.72 | 5.14 | 23.50 |
| (C)* | High | 18 | 28.94 | 28.63 | 5.83 | 26.11 |
| (C) | Low | 18 | 25.72 | 26.09 | 7.14 | 24.17 |

*(E) = Experimental Group (C) = Control Group

TABLE LXVIII

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 2, SCALE 7

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 78.26 | 78.26 | 2.51 |
| C.G.P.A. | 1 | 56.98 | 56.98 | 1.83 |
| T X C.G.P.A. | 1 | 9.04 | 9.04 | .29 |
| Error | 67 | 2086.70 | 31.14 | |

$F_{1,67,.05} = 3.99$

TABLE LXIX

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X C.G.P.A. - POSTTEST 2, SCALE 8

| Treatment Group | C.G.P.A. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | High | 18 | 24.83 | 24.52 | 5.50 | 23.67 |
| (E) | Low | 18 | 20.56 | 21.18 | 6.46 | 21.28 |
| (C)* | High | 18 | 27.72 | 27.24 | 5.40 | 24.11 |
| (C) | Low | 18 | 25.22 | 25.39 | 6.77 | 22.43 |

*(E) = Experimental Group (C) = Control Group

TABLE LXX

ANALYSIS OF COVARIANCE (TREATMENT X C.G.P.A.) OF POSTTEST 2, SCALE 8

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 214.93 | 214.93 | 6.48* |
| C.G.P.A. | 1 | 116.67 | 116.67 | 3.52 |
| T X C.G.P.A. | 1 | 10.13 | 10.13 | .31 |
| Error | 67 | 2223.59 | 33.19 | |

* Significant at the .05 level; $F_{1,67,.05} = 3.99$

for each main effect, interaction, and the error were given in column two. The sums of squares (S.S) and mean square (M.S.) values for sources of variation were listed in columns three and four. F statistics which tested for the differences in levels of the main effect variables and for interaction effects (treatment X C.G.P.A. group) on posttest one, sub-scale one, were recorded in column five. An obtained F value of $F_{1,67,.05}$ of 3.99 or larger would imply a significant difference between the means of the main effects or significant interaction among the two independent variables. All tables from XLI to LXX may be interpreted in the same manner as tables XXXIX and XL.

Table LXXI contained descriptive statistics on posttest one, subscale one for the two-way analysis of covariance between the independent variables of treatment effect and home place of residence. The characteristics of the subjects in each of the six cells of the two-way fully crossed analysis of covariance design are listed in the first two columns. The criteria used to categorize home place of residence, and experimental and control groups were included in Chapter III. The third column indicated that either six, eleven, or thirteen subjects were in each cell of the control and experimental groups. The mean score calculated for each group of students was in column four. The adjusted means of the posttest one, sub-scale one were computed by analysis of covariance and were in column five. The standard deviations of the original scores were in column six. The means of the covariate (pretest) in column seven ranged from 10.76 to 15.17.

The main effects, interactions, and error which were sources of variation in the analysis of covariance were listed in column one of

TABLE LXXI

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 1, SCALE 1

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 14.00 | 12.94 | 1.90 | 15.17 |
| (E) | Small Town | 11 | 14.36 | 14.77 | 3.64 | 11.82 |
| (E) | Large City | 13 | 13.62 | 12.98 | 3.66 | 14.23 |
| (C)* | Farm | 6 | 11.67 | 12.18 | 2.34 | 11.57 |
| (C) | Small Town | 11 | 11.45 | 12.32 | 2.89 | 10.76 |
| (C) | Large City | 13 | 12.46 | 12.29 | 4.25 | 13.14 |

*(E) = Experimental Group (C) = Control Group

TABLE LXXII

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 1, SCALE 1

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 20.77 | 20.77 | 2.09 |
| Home Residence (H.R.) | 2 | 5.50 | 5.50 | .55 |
| T X H. R. | 2 | 5.30 | 5.30 | .53 |
| Error | 53 | 525.36 | 9.91 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE LXXIII

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 1, SCALE 2

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 12.17 | 11.82 | 2.86 | 14.00 |
| (E) | Small Town | 11 | 12.55 | 12.52 | 2.38 | 13.18 |
| (E) | Large City | 13 | 13.62 | 13.00 | 4.29 | 14.69 |
| (C)* | Farm | 6 | 12.83 | 13.11 | 4.96 | 12.43 |
| (C) | Small Town | 11 | 9.73 | 10.42 | 2.87 | 11.36 |
| (C) | Large City | 13 | 12.85 | 12.93 | 3.51 | 12.92 |

*(E) = Experimental Group (C) = Control Group

TABLE LXXIV

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 1, SCALE 2

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 1.13 | 1.13 | .11 |
| Home Residence (H.R.) | 2 | 12.91 | 12.91 | 1.24 |
| T X H. R. | 2 | 12.41 | 12.41 | 1.19 |
| Error | 53 | 551.65 | 10.41 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE LXXV

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 1, SCALE 3

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 13.33 | 12.66 | 3.01 | 13.33 |
| (E) | Small Town | 11 | 13.73 | 13.09 | 5.59 | 13.27 |
| (E) | Large City | 13 | 12.08 | 11.44 | 3.23 | 13.28 |
| (C)* | Farm | 6 | 10.67 | 11.12 | 4.03 | 11.67 |
| (C) | Small Town | 11 | 11.82 | 12.86 | 4.62 | 10.82 |
| (C) | Large City | 13 | 10.85 | 11.24 | 3.29 | 11.77 |

*(E) = Experimental Group (C) = Control Group

TABLE LXXVI

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 1, SCALE 3

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 5.38 | 5.38 | .47 |
| Home Residence (H.R.) | 2 | 16.08 | 16.08 | 1.40 |
| T X H.R. | 2 | 2.07 | 2.07 | .18 |
| Error | 53 | 608.81 | 11.49 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE LXXVII

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 1, SCALE 4

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 13.17 | 12.35 | 3.50 | 12.83 |
| (E) | Small Town | 11 | 11.25 | 11.02 | 5.34 | 12.00 |
| (E) | Large City | 13 | 12.23 | 11.68 | 4.51 | 12.46 |
| (C)* | Farm | 6 | 12.50 | 13.32 | 3.08 | 10.50 |
| (C) | Small Town | 11 | 10.75 | 11.97 | 3.88 | 9.91 |
| (C) | Large City | 13 | 11.38 | 11.10 | | 12.08 |

*(E) = Experimental Group (C) = Control Group

TABLE LXXVIII

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 1, SCALE 4

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 2.58 | 2.58 | .28 |
| Home Residence (H.R.) | 2 | 9.43 | 9.43 | 1.03 |
| T X H.R. | 2 | 4.27 | 4.27 | .47 |
| Error | 53 | 483.66 | 9.13 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE LXXIX

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 1, SCALE 5

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 27.50 | 27.43 | 4.04 | 26.50 |
| (E) | Small Town | 11 | 26.09 | 24.71 | 3.94 | 29.18 |
| (E) | Large City | 13 | 25.00 | 25.37 | 3.83 | 25.62 |
| (C)* | Farm | 6 | 26.67 | 28.64 | 9.27 | 22.33 |
| (C) | Small Town | 11 | 25.87 | 26.94 | 5.97 | 24.18 |
| (C) | Large City | 13 | 29.54 | 28.56 | 4.48 | 28.35 |

*(E) = Experimental Group (C) = Control Group

TABLE LXXX

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 1, SCALE 5

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 62.96 | 62.96 | 2.96 |
| Home Residence (H.R.) | 2 | 19.56 | 19.56 | .92 |
| T X H.R. | 2 | 3.82 | 3.82 | .18 |
| Error | 53 | 1128.61 | 21.29 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE LXXXI

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 1, SCALE 6

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 26.83 | 26.95 | 6.52 | 27.17 |
| (E) | Small Town | 11 | 24.73 | 24.46 | 5.10 | 28.09 |
| (E) | Large City | 13 | 23.77 | 25.35 | 5.40 | 23.69 |
| (C)* | Farm | 6 | 29.27 | 27.77 | 7.63 | 31.00 |
| (C) | Small Town | 11 | 26.45 | 27.07 | 7.03 | 26.00 |
| (C) | Large City | 13 | 29.92 | 28.69 | 4.57 | 30.38 |

*(E) = Experimental Group (C) = Control Group

TABLE LXXXII

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 1, SCALE 6

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 63.52 | 63.52 | 2.09 |
| Home Residence (H.R.) | 2 | 13.37 | 13.37 | .44 |
| T X H.R. | 2 | 6.44 | 6.44 | .21 |
| Error | 53 | 1607.60 | 30.33 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE LXXXIII

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 1, SCALE 7

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 27.33 | 26.70 | 4.18 | 26.83 |
| (E) | Small Town | 11 | 25.09 | 24.38 | 5.45 | 27.00 |
| (E) | Large City | 13 | 22.46 | 23.71 | 4.79 | 22.46 |
| (C)* | Farm | 6 | 26.33 | 25.77 | 7.99 | 26.67 |
| (C) | Small Town | 11 | 24.91 | 25.28 | 5.05 | 24.51 |
| (C) | Large City | 13 | 26.62 | 26.21 | 4.77 | 26.31 |

*(E) = Experimental Group (C) = Control Group

TABLE LXXXIV

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 1, SCALE 7

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 9.04 | 9.04 | .40 |
| Home Residence (H.R.) | 2 | 8.53 | 8.53 | .37 |
| T X H.R. | 2 | 12.10 | 12.10 | .53 |
| Error | 53 | 1207.43 | 22.78 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE LXXXV

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 1, SCALE 8

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 25.50 | 24.53 | 4.68 | 24.67 |
| (E) | Small Town | 11 | 20.91 | 21.75 | 6.73 | 20.55 |
| (E) | Large City | 13 | 21.46 | 21.83 | 5.39 | 21.62 |
| (C)* | Farm | 6 | 24.67 | 23.55 | 6.92 | 25.00 |
| (C) | Small Town | 11 | 25.58 | 26.18 | 5.28 | 21.09 |
| (C) | Large City | 13 | 26.42 | 25.80 | 4.12 | 23.85 |

*(E) = Experimental Group (C) = Control Group

TABLE LXXXVI

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF
POSTTEST 1, SCALE 8

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 81.54 | 81.54 | 3.15 |
| Home Residence (H.R.) | 2 | .24 | .24 | .01 |
| T X H.R. | 2 | 32.26 | 32.26 | 1.24 |
| Error | 53 | 1374.01 | 25.92 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE LXXXVII

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 2, SCALE 1

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 13.00 | 11.56 | 3.22 | 15.17 |
| (E) | Small Town | 11 | 12.09 | 12.64 | 2.98 | 11.82 |
| (E) | Large City | 13 | 10.71 | 9.83 | 3.18 | 14.23 |
| (C)* | Farm | 6 | 11.83 | 12.53 | 4.75 | 11.57 |
| (C) | Small Town | 11 | 10.22 | 11.39 | 2.81 | 10.76 |
| (C) | Large City | 13 | 12.23 | 12.00 | 4.68 | 13.14 |

*(E) = Experimental Group (C) = Control Group

TABLE LXXXVIII

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 2, SCALE 1

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 4.93 | 4.93 | .51 |
| Home Residence (H.R.) | 2 | 8.63 | 8.63 | .90 |
| T X H.R. | 2 | 17.56 | 17.56 | 1.83 |
| Error | 53 | 508.26 | 9.59 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE LXXXIX

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 2, SCALE 2

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 14.17 | 13.76 | 1.60 | 14.00 |
| (E) | Small Town | 11 | 11.55 | 11.52 | 2.70 | 13.18 |
| (E) | Large City | 13 | 10.23 | 9.53 | 4.00 | 14.69 |
| (C)* | Farm | 6 | 13.33 | 13.64 | 2.88 | 12.43 |
| (C) | Small Town | 11 | 10.55 | 11.34 | 2.70 | 11.36 |
| (C) | Large City | 13 | 13.38 | 13.48 | 4.44 | 12.92 |

*(E) = Experimental Group (C) = Control Group

TABLE XC

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 2, SCALE 2

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 18.73 | 18.73 | 2.09 |
| Home Residence (H.R.) | 2 | 24.13 | 24.13 | 2.70 |
| T X H.R. | 2 | 31.15 | 31.15 | 3.48* |
| Error | 53 | 474.25 | 8.95 | |

* $F_{1,53,.05} = 4.08$ significant at the .05 level; $F_{2,53,.05} = 3.19$

TABLE XCI

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 2, SCALE 3

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 11.50 | 10.92 | 3.21 | 13.33 |
| (E) | Small Town | 11 | 11.55 | 11.00 | 3.56 | 13.27 |
| (E) | Large City | 13 | 10.92 | 10.38 | 2.72 | 13.28 |
| (C)* | Farm | 6 | 10.50 | 10.90 | 2.74 | 11.67 |
| (C) | Small Town | 11 | 10.82 | 11.71 | 2.99 | 10.82 |
| (C) | Large City | 13 | 11.77 | 12.11 | 4.07 | 11.77 |

*(E) = Experimental Group (C) = Control Group

TABLE XCII

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 2, SCALE 3

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 8.15 | 8.15 | 1.16 |
| Home Residence (H.R.) | 2 | .79 | .79 | .11 |
| T X H.R. | 2 | 3.53 | 3.53 | .50 |
| Error | 53 | 372.21 | 7.02 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE XCIII

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 2, SCALE 4

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 12.17 | 11.62 | 2.48 | 12.83 |
| (E) | Small Town | 11 | 10.45 | 10.30 | 3.27 | 12.00 |
| (E) | Large City | 13 | 10.69 | 10.32 | 4.59 | 12.46 |
| (C)* | Farm | 6 | 10.67 | 11.22 | 3.44 | 10.50 |
| (C) | Small Town | 11 | 9.27 | 10.10 | 3.00 | 9.91 |
| (C) | Large City | 13 | 10.38 | 10.19 | 3.88 | 12.08 |

*(E) = Experimental Group (C) = Control Group

TABLE XCIV

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 2, SCALE 4

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | .75 | .75 | .07 |
| Home Residence (H.R.) | 2 | 6.79 | 6.79 | .65 |
| T X H.R. | 2 | .078 | .078 | .01 |
| Error | 53 | 550.20 | 10.38 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE XCV

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 2, SCALE 5

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 26.33 | 26.27 | 4.50 | 26.50 |
| (E) | Small Town | 11 | 28.36 | 27.08 | 3.91 | 29.18 |
| (E) | Large City | 13 | 25.54 | 25.88 | 5.04 | 25.62 |
| (C)* | Farm | 6 | 28.33 | 30.17 | 10.23 | 22.33 |
| (C) | Small Town | 11 | 27.47 | 28.47 | 6.57 | 24.18 |
| (C) | Large City | 13 | 29.23 | 28.32 | 5.28 | 28.35 |

*(E) = Experimental Group (C) = Control Group

TABLE XCVI

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 2, SCALE 5

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 85.29 | 85.29 | 2.86 |
| Home Residence (H.R.) | 2 | 5.68 | 5.68 | .19 |
| T X H.R. | 2 | 6.14 | 6.14 | .21 |
| Error | 53 | 1580.86 | 29.83 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE XCVII

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 2, SCALE 6

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 29.33 | 29.43 | 3.14 | 27.17 |
| (E) | Small Town | 11 | 27.00 | 26.77 | 4.71 | 28.09 |
| (E) | Large City | 13 | 24.38 | 25.72 | 6.86 | 23.69 |
| (C)* | Farm | 6 | 30.83 | 29.57 | 4.96 | 31.00 |
| (C) | Small Town | 11 | 26.09 | 26.60 | 5.11 | 26.00 |
| (C) | Large City | 13 | 31.85 | 30.80 | 5.51 | 30.38 |

*(E) = Experimental Group (C) = Control Group

TABLE XCVIII

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 2, SCALE 6

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 35.50 | 35.50 | 1.34 |
| Home Residence (H.R.) | 2 | 32.70 | 32.70 | 1.23 |
| T X H.R. | 2 | 43.61 | 43.61 | 1.65 |
| Error | 53 | 1404.25 | 26.50 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE XCIX

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 2, SCALE 7

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 25.83 | 25.25 | 4.62 | 26.83 |
| (E) | Small Town | 11 | 26.64 | 25.98 | 5.45 | 27.00 |
| (E) | Large City | 13 | 23.54 | 24.69 | 4.59 | 22.46 |
| (C)* | Farm | 6 | 30.67 | 30.15 | 8.45 | 26.66 |
| (C) | Small Town | 11 | 25.82 | 26.16 | 5.91 | 24.51 |
| (C) | Large City | 13 | 28.23 | 27.85 | 5.51 | 26.31 |

*(E) = Experimental Group (C) = Control Group

TABLE C

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF
POSTTEST 2, SCALE 7

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment (T) | 1 | 101.21 | 101.21 | 3.64 |
| Home Residence (H.R.) | 2 | 11.13 | 11.13 | .40 |
| T X H.R. | 2 | 24.20 | 24.20 | .87 |
| Error | 53 | 1472.06 | 27.77 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

TABLE CI

DESCRIPTIVE STATISTICS
TWO-WAY ANALYSIS OF COVARIANCE
TREATMENT X HOME RESIDENCE - POSTTEST 2, SCALE 8

| Treatment Group | Home Res. Group | Number | Mean | Adj. Mean | Std. Dev. | Mean of Cov. (Pretest) |
|---|---|---|---|---|---|---|
| (E)* | Farm | 6 | 25.83 | 24.54 | 5.04 | 24.67 |
| (E) | Small Town | 11 | 23.18 | 24.29 | 7.86 | 20.55 |
| (E) | Large City | 13 | 21.15 | 21.64 | 5.40 | 21.62 |
| (C)* | Farm | 6 | 30.16 | 28.68 | 8.35 | 25.00 |
| (C) | Small Town | 11 | 24.45 | 25.25 | 6.80 | 21.09 |
| (C) | Large City | 13 | 26.85 | 26.03 | 5.51 | 23.85 |

*(E) = Experimental Group (C) = Control Group

TABLE CII

ANALYSIS OF COVARIANCE (TREATMENT X HOME RESIDENCE) OF POSTTEST 2, SCALE 8

| Source | d.f. | S.S. | M.S. | F |
|---|---|---|---|---|
| Treatment | 1 | 133.17 | 133.17 | 3.89 |
| Home Residence (H.R.) | 2 | 30.95 | 30.95 | .90 |
| T X H.R. | 2 | 19.64 | 19.64 | .57 |
| Error | 53 | 1815.31 | 34.25 | |

$F_{1,53,.05} = 4.08$ $F_{2,53,.05} = 3.19$

Table LXXII. The main effects were treatment and the home place of residence classification group. The interaction measured was between the treatment and home place of residence. Column two contained the degrees of freedom (d.f.) for each main effect, interaction, and the error. The sums of squares (S.S) were listed in column three. Column four included the mean square (M.S.) scores. The F statistics in column five tested for the differences in the levels of the main effect variables and for interaction effects (treatment X home place of residence group) on posttest one, sub-scale one. The table value for $F_{2,53,.05}$ was 3.19. An obtained F value of 3.19 or larger would lead to a rejection at the .05 level of the null hypothesis being tested, and suggest a significant difference.

Summary of Analyses of Covariance

Table CIII was a summarization of the significant differences identified in the one-way and two-way analyses of covariance in Tables VII to CII. Tables of descriptive statistics and analyses of covariance were paired in preceding pages to make an analysis of the data and to test the five null hypotheses of this study. The summary information that was contained in Table CIII and the data in Tables VII to CII can be used to test the hypotheses.

The posttest sub-scales of column one of Table CIII were the dependent variables of this study. The heading for column two illustrated the one-way analysis of covariance and columns three to eight the two-way analyses of covariance designs that were implemented. The information contained in the rows and columns of the table revealed any significant differences at the .05 level between the means

of the independent variables, and any interactions between the independent variables. Columns two to six indicate any significant differences between means, while columns seven and eight show interactions occuring.

Hypothesis 1. There is no significant difference between the experimental and control groups on each of the eight sub-scales.

The table value for $F_{1,73,.05}$ was 3.98. This value held for all F statistics used in column two ($Ho_1$ - Treatment) of Table CIII. The null nypothesis one failed to reject for sub-scales one, two, three, four, and seven of posttest one. The null hypothesis one was rejected for sub-scales five, six, and eight of posttest one as significant differences at the .05 level between means of the experimental and control groups were detected.

On posttest two the null hypothesis one failed to reject for subscales one, three, four, and seven. The null hypothesis was rejected for sub-scales two, five, six, and eight of posttest two as obtained values were all above the 3.98 table value of $F_{1,73,.05}$.

The one-way analysis of covariance and computed F values described in the preceding two paragraphs were the major test of hypothesis one. These findings were listed in column one of Table CIII.

The two-way analysis of covariance procedure allowed hypothesis one to be retested. Any significant difference between the means of the experimental and control groups on each of the eight sub-scales found in the two-way analysis of covariance could be used to check the findings of the one-way analysis of covariance. Column two ($Ho_1$ - C.P.G.A.) data were obtained from the two-way analysis of

TABLE CIII

SUMMARY OF SIGNIFICANT DIFFERENCE TEST RESULTS
FOR ONE-WAY AND TWO-WAY ANALYSES OF COVARIANCE

| | ONE-WAY ANCOVA | TWO-WAY ANCOVA | | | | | |
|---|---|---|---|---|---|---|---|
| Dependent Variable | $Ho_1$ Treatment (T) | $Ho_1$ Treatment[a] | $Ho_1$ Treatment[b] | $Ho_2$ C.G.P.A. | $Ho_3$ Home | $Ho_4$ T X C.G.P.A. | $Ho_5$ T X Home |
| Posttest 1, Sub-scale 1 | N.S.* | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Posttest 1, Sub-scale 2 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Posttest 1, Sub-scale 3 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Posttest 1, Sub-scale 4 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Posttest 1, Sub-scale 5 | SIG.* | SIG. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Posttest 1, Sub-scale 6 | SIG. | SIG. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Posttest 1, Sub-scale 7 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Posttest 1, Sub-scale 8 | SIG. | SIG. | N.S. | SIG. | N.S. | N.S. | N.S. |
| Posttest 2, Sub-scale 1 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Posttest 2, Sub-scale 2 | SIG. | SIG. | N.S. | N.S. | N.S. | N.S. | SIG. |
| Posttest 2, Sub-scale 3 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Posttest 2, Sub-scale 4 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Posttest 2, Sub-scale 5 | SIG. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Posttest 2, Sub-scale 6 | SIG. | N.S. | N.S. | N.S. | N.S. | SIG. | N.S. |
| Posttest 2, Sub-scale 7 | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. | N.S. |
| Posttest 2, Sub-scale 8 | SIG. | SIG. | N.S. | N.S. | N.S. | N.S. | N.S. |

*SIG. = Significant difference at the .05 level. N.S. = Not significant at the .05 level.
Treatment[a] = Test for treatment effects ($Ho_1$) in two-way ANCOVA. Treatment X C.G.P.A.
Treatment[b] = Test for treatment effects ($Ho_1$) in two-way ANCOVA. Treatment X Home place of residence.

covariance between cumulative grade point average and the treatment. The null hypothesis one was rejected for sub-scales five, six, and eight of posttest one, and sub-scales two and eight of posttest two. These findings supported the rejection of the null hypothesis one obtained in the one-way analysis of covariance for those specific sub-scales. No significant differences were observed in column three ($Ho_1$ - Home) of Table CIII. Fewer subjects in each cell of the two-way analyses of covariance designs would lead to decreased power to detect differences. In the one-way design used in this study the number of subjects per cell was thirty-seven and thirty-nine. In the two-way design between home town and treatment (Column three, $Ho_1$ - Home) the number of subjects in cells was six, eleven, or thirteen, totaling 30 for both experimental and control groups.

Hypothesis 2. There is no significant difference between the means of the high cumulative grade point average group and the low cumulative grade point average group on each of the eight sub-scales.

The table value for $F_{1,67,.05}$ was 3.99. This value held for all F statistics used in column five ($Ho_2$ - C.P.G.A.) of Table CIII. The null hypothesis two was rejected at the .05 level for posttest one, sub-scale eight. In all other sub-scales of posttests one and two the null hypothesis two failed to reject. The fact that only one of the sixteen F statistics tested under hypothesis two was significant should lead to caution in interpreting the one significant F value. A Type I error (rejecting a true null hypothesis) may have occurred.

Hypothesis 3. There is no significant difference between the

means of the three types of home place of residence on each of the eight sub-scales.

The table value for $F_{2,53,.05}$ was 3.19. This value held for all F statistics used in column six ($Ho_3$ - Home) of Table CIII. The null hypothesis three failed to reject for all values calculated for the sixteen sub-scales of posttest one and posttest two.

Hypothesis 4. There is no significant interaction between the treatment variable and the cumulative grade point average group variable for each of the eight sub-scales.

The table value for $F_{1,67,.05}$ was 3.99. This value held for all F statistics used in column seven ($Ho_4$ - T X C.G.P.A.) of Table CIII. The null hypothesis four was rejected at the .05 level for posttest two, sub-scale six. Null hypothesis four failed to reject for the remaining fifteen sub-scales of posttests one and two. Caution must be exercised in interpreting the single value tested under hypothesis four that was significant at the .05 level. A Type I error may have occurred again.

Hypothesis 5. There is no significant interaction between the treatment variable and home place of residence group variable for each of the eight sub-scales.

The table value for $F_{2,53,.05}$ was 3.19. This value held for all F statistics used in column eight ($Ho_5$ - T X Home) of Table CIII. The null hypothesis was rejected for sub-scale two of posttest two as significance at the .05 level was detected. The null hypothesis five failed to reject for the other fifteen sub-scales of posttests one and two. As previously cautioned in the discussion of hypothesis two and

hypothesis four, care in interpreting this single significant value must be taken as a Type I sampling error may be present.

The obtained F values in the analyses of covariance provided data for testing the significance of means of the main effects and the significance of the interactions. The patterns of the means in the descriptive statistics provided additional information concerning general distributions of data. The adjusted means for the effect of the treatment on the experimental and control groups in sub-scales one to eight of posttests one and two, are in Table CIV.

Column one of Table CIV indicated the eight sub-scales of the Education Attitude Index. The sub-scales in either the DESIRABLE or EXISTS column of the Index were in the second column. The adjusted means of treatment effect on the experimental and control groups for posttests one and two were listed in columns three, four, five, and six. Columns seven and eight indicated the posttest gains experienced by the experimental and control groups. Posttest gains were computed by subtracting the posttest one score from the posttest two score.

In Table CIV the adjusted means for sub-scales one to four (DESIRABLE) of posttest one for the experiment group range from 11.13 to 13.31. The same adjusted means for the control group were from 11.66 to 12.15. The control group had lower (more favorable) scores than did the experimental group on sub-scales one, two, and three. The experimental group had adjusted means from 21.91 to 25.18 for sub-scales five to eight (EXISTS) of posttest one. These scores were all lower than those of the control group which were from 25.36 to 28.25. The experimental group had more favorable responses on posttest

TABLE CIV

ADJUSTED MEANS FOR SUB-SCALES ONE TO EIGHT
POSTTEST ONE AND POSTTEST TWO*

| | | POSTTEST ONE | | POSTTEST TWO | | POSTTEST GAINS[3] | |
|---|---|---|---|---|---|---|---|
| DEPENDENT VARIABLE (SUB-SCALE) | DESIRABLE OR EXISTS | E[1] | C[2] | E | C | E | C |
| 1 | DESIRABLE | 13.31 | 12.09 | 11.08 | 12.09 | 2.23 | .00 |
| 2 | DESIRABLE | 12.24 | 12.15 | 10.70 | 12.44 | 1.54 | -.29 |
| 3 | DESIRABLE | 11.97 | 11.66 | 10.34 | 11.47 | 1.63 | .19 |
| 4 | DESIRABLE | 11.13 | 11.70 | 10.56 | 10.61 | .57 | 1.09 |
| 5 | EXISTS | 25.18 | 28.12 | 26.16 | 28.73 | -.98 | -.61 |
| 6 | EXISTS | 24.83 | 28.25 | 26.59 | 29.16 | -1.76 | -.91 |
| 7 | EXISTS | 24.27 | 26.18 | 25.03 | 27.36 | -.76 | -1.18 |
| 8 | EXISTS | 21.91 | 25.36 | 22.73 | 26.25 | -.82 | -.89 |

* A higher score implies a less favorable attitude

[1] E = Experimental group [2] C = Control Group

[3] POSTTEST GAIN = Posttest 1 - Posttest 2. Positive gain implies increase in attitude.

one for sub-scales four to eight; the control group had more favorable responses for sub-scales one to three.

An examination of posttest two in Table CIV indicated that the experimental group had lower adjusted means for sub-scales one to four (DESIRABLE) than the control group did. The experimental group also had lower adjusted means for sub-scales five to eight (EXISTS). All adjusted means of the eight sub-scales in posttest two revealed the experimental group had lower (more favorable) scores than those of the control group.

The experimental group had noticeable posttest gains for sub-scales one to four in Table CIV (DESIRABLE). These improvements ranged from .57 to 2.23. The control group had two posttest gains of 1.09 and .19; one adjusted mean with no gain; and one adjusted mean with a drop of -.29. Both experimental and control groups indicated a less favorable attitude for sub-scales five to eight (EXISTS) on posttest two. The experimental group adjusted means dropped from -.76 to -1.76; the control group dropped from -.61 to -1.18.

Findings

The findings numbered one through eight below were derived from the one-way analyses of covariance of the independent variable of treatment. The main concern of this study was to determine the effect of the treatment on the experimental and control groups. The posttest scores were statistically adjusted by covarying on the pretest score. This was necessary because naturally assembled groups were selected for this study. All tests of significance were at the .05 level. Significant differences between the means of experimental and control

groups were tested in numbers one through eight. When comparing the experimental and control groups the following findings resulted:

1. There was no significant difference on sub-scale one (DESIRABLE - the structure of the educational experience) of posttest one and posttest two.
2. There was no significant difference on sub-scale two (DESIRABLE - the learning environment) of posttest one, but a significant difference was indicated on posttest two.
3. There was no significant difference on sub-scale three (DESIRABLE - student to student relationships) of posttest one and posttest two.
4. There was no significant difference on sub-scale four (DESIRABLE - student and teacher relationships) of posttest one and posttest two.
5. There was a significant difference on sub-scale five (EXISTS - the structure of the educational experience) of posttest one and posttest two.
6. There was a significant difference on sub-scale six (EXISTS - the learning environment) of posttest one and posttest two.
7. There was no significant difference on sub-scale seven (EXISTS - student to student relationships) of posttest one and posttest two.
8. There was a significant difference on sub-scale eight

(EXISTS - student and teacher relationships of posttest one and posttest two.

The following findings were calculated by the two-way analysis of covariance for each of the eight sub-scales and dealt with differences between the means of cumulative grade point average groups; and the differences between the means of home place of residence groups. All tests of significance were at the .05 level.

1. There was a significant difference between the means of the high cumulative grade point average group and the low cumulative grade point average group on sub-scale eight (EXISTS - teacher and student relationships) of posttest one.
2. There were no significant differences between the means of the high cumulative grade point average group and the low cumulative grade point average group on the remaining fifteen sub-scales of posttest one and posttest two.
3. There were no significant differences between the means of the three types of home place of residence on each of the eight sub-scales for both posttest one and posttest two.

The following findings dealt with the interaction of the independent variables tested in this study. Interactions between treatment and the cumulative grade point average groups, and between treatment and the home place of residence groups were computed. All tests of significance were at the .05 level.

1. There was a significant difference between the treatment variable and the cumulative grade point average group variable

on sub-scale six (EXISTS - the learning environment) of posttest two.

2. There were no significant differences between the treatment variable and the cumulative grade point average group variable on the remaining fifteen sub-scales of posttest one or posttest two.
3. There was a significant difference between the treatment variable and the home place of residence group variable on sub-scale two (DESIRABLE - the learning environment) of posttest two.
4. There were no significant differences between the treatment variable and the home place of residence group variable on the remaining fifteen sub-scales of posttest one and posttest two.

An analysis of the treatment effect on the means of the experimental and control groups (Figure 10) occurred. The findings listed below reflect observed patterns of means on the eight sub-scales of posttest one and posttest two. Posttest one reflects short-term effects and posttest two long-term effects. After the analysis of covariance (pretest) occurred adjusted means were examined.

1. The adjusted means of sub-scales one to three (DESIRABLE) for posttest one indicated the control group had a more favorable response to those Index items than the experimental group.
2. The adjusted means of sub-scales four to eight (EXISTS) of posttest one indicated that the experimental group had a

more favorable response to Index items than the control group did.

3. The adjusted means of sub-scales one to eight (DESIRABLE) for posttest two indicated the experimental group had a more favorable response to the Index items than the control group.

# CHAPTER V

## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

### Summary

The purpose of the study was to measure the effects of an experimental, interdisciplinary, outdoor education program on selected students enrolled in the two year elementary teacher preparation program of the University of Saskatchewan, Regina Campus. An attempt was made to determine changes in student attitudes, interests, and values caused by the experiment.

Professional organizations and leaders in education had recommended that the teacher education program be based on an integrated set of experiences. They advocated experimentation in teacher education curriculum which would strive to integrate teaching methods and subject area courses. Research dealing with a systematic evaluation of cognitive and affective variables related to existing interdisciplinary teacher education programs was lacking.

The Faculty of Education, University of Saskatchewan, Regina Campus, interdisciplinary, outdoor education project during the January Semester, 1972, was an attempt to develop a total approach to the teaching of methods classes. Five instructors jointly prepared and implemented a program which allowed full use of problem solving techniques by participating students.

The sample used in this study consisted of seventy-six second

year students in the elementary teacher education program at the University of Saskatchewan, Regina Campus, in January Semester, 1972. Thirty-nine students in one class section were the control group. Thirty-seven students in another class section were the experimental group. Each of the two groups had a common class schedule and the same instructors for five teaching methods classes.

A nonequivalent control group design, described by Campbell and Stanley (16:47) as a quasi-experimental type, was used for this study. The control and experimental groups were naturally assembled collectives. A pretest, posttest one, and posttest two were administered to both groups.

The main treatment experienced by the experimental group was the four day off-campus outdoor education experience. Art, health-physical education, mathematics, science and socials studies teaching methods class instructors cooperated in the operation of an interdisciplinary program for the students. Preparatory and follow-up activities occurred on the Regina Campus.

The instrument used was the Education Attitude Index which was constructed by the researcher. Student attitudes and perceptions concerning four areas of the learning experience were measured. These four areas were: (1) the structure of educational experiences, (2) the learning environment, (3) student to student relationships, and (4) student and teacher relationships. Students were asked to answer two categories of questions: (1) Do you feel that this should be a worthwhile or DESIRABLE condition in an elementary school in Saskatchewan, and (2) Do you feel that this condition EXISTS in the

professional education classes of the two year elementary education program at the University of Saskatchewan, Regina Campus. Information about sex, age, cumulative grade point average, education grade point average, and population of home place of residence was collected from each student.

The twenty-four index items and four scales (eight sub-scales) were developed by using questionnaire and interview techniques with instructors and second year students at the Regina Campus. Additional content validity was established by the solicitation of the expert advice of selected instructors during construction of the Index.

A factor analysis of the instrument was made to gain empirical confirmation of the logical scales. A rotated factor matrix was computed and it strongly supported the existence of the scales developed in the construction of the Index.

Descriptive statistics and analyses of covariance (pretest) were calculated for the eight sub-scales of the pretest and two posttests; for the experimental group; and the control group. The descriptive statistics were analyzed to detect patterns of means. A one-way analysis of covariance was used to measure differences between the means of the experimental and control groups on each of the eight sub-scales. A two-way analysis of covariance was used to evaluate each of the eight sub-scales for: (1) differences between the means of the high cumulative grade point average group and the low cumulative grade point average groups, (2) differences between the means of the three types of home place of residence, (3) interaction between the treatment variable and the cumulative grade point average group variable,

and (4) interaction between the treatment variable and home place of residence group variable.

Conclusions

This study was concerned with the measurement of attitude change in students participating in an experimental program. The instrument used to measure attitude change was a self-constructed index. Criticisims of this type of study center on questions of validity and reliability of the test instrument. This investigator attempted to overcome these difficulties by the procedures described in Chapter III that were used in developing the Education Attitude Index. The limitations posed by these factors must be considered in analyzing the findings and conclusions of this study.

The nonequivalent control group design was of the quasi-experimental type and as such had certain limitations posed by the use of naturally assembled collectives. The controls suggested by Campbell and Stanley (16:47-50) were adhered to as much as was possible. Sources of internal and external invalidity must be appraised when interpreting the conclusions.

The sample was limited to seventy-six students. The sample was representative only of the second year elementary education major student population of the University of Saskatchewan-Regina Campus. The accuracy of the data was limited by the ability of the students to interpret the Index items. Each student interpreted the items within his own frame of reference. Caution should be exercised in generalizing the results beyond the limits of this select student population of the University.

On the basis of the data presented in this investigation the following conclusions appeared warranted:

1. The interdisciplinary outdoor education program contributed significantly in developing favorable changes in students' attitudes toward conditions that EXIST in the professional education classes of the 3 year elementary education program concerning: (1) the structure of the learning experience, (2) the learning environment, and (3) student and teacher relationships. The program had no statistically significant effect on student to student relationships.
2. The favorable changes in attitudes concerning conditions that EXIST in the professional program were both short-term and long-term, although some regression occurred when students returned to traditional teaching methods classes on the Regina Campus.
3. The interdisciplinary outdoor education program may have caused a favorable, though not statistically significant, change in the attitudes and perceptions of students toward what should be a worthwhile or DESIRABLE condition in an elementary school in Saskatchewan.
4. Control group students in the traditional methods class program did not noticeably change their attitudes toward what should be a worthwhile or DESIRABLE condition in an elementary school in Saskatchewan.
5. The students in the control group apparently developed a less favorable attitude toward conditions that EXIST in the

second year elementary education methods classes at Regina Campus.

6. Students in the control and experimental groups had a much more favorable attitude toward Index items pertaining to DESIRABLE conditions in elementary schools in Saskatchewan, than those same conditions that EXIST in the professional education classes of the two-year elementary education program.

Recommendations

As stated in Chapter I, the desired outcome of this study was to provide the Faculty of Education of the University of Saskatchewan-Regina Campus with data on which to base possible curriculum improvements. On the basis of data analyzed in this study, the following recommendations are suggested:

1. The interdisciplinary outdoor education program should be expanded to include all second year elementary education major students at the University of Saskatchewan, Regina Campus. Indications of the development of favorable attitudinal changes toward programs that are DESIRABLE in elementary schools of Saskatchewan and that EXIST in the teacher education curriculum warrant this recommendation.
2. The study should be replicated with a variety of on-campus and off-campus interdisciplinary experiences offered for student participants. This would allow measurement of the effectiveness of different types of interdisciplinary curriculum offerings.

3. The Education Attitude Index should be further analyzed to determine the reliability and validity of the items of the four scales and the scales themselves.
4. The study should be repeated with a longer treatment period utilizing a variety of interdisciplinary experiences within a flexible time schedule. A longer treatment may counteract the development of less favorable attitudes toward the EXISTS programs revealed by the experimental group from posttest one to posttest two.
5. Long-term measurement of attitude changes should occur. A posttest three administered six months or longer after the posttest two and evaluating the effects of the treatment on the experimental and control group, could add important data to the study.
6. The results obtained by a future study would probably be strengthened by having all instructors and students participate jointly in preparation and follow-up activities related to a main interdisciplinary experience.
7. A study should be made to determine why the control group developed less favorable attitudes toward conditions that EXIST in the professional education classes of the two year elementary education program at the University of Saskatchewan, Regina Campus. The same pattern existed from posttest one to posttest two for the experimental group.

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# APPENDICES

# APPENDIX A

## EDUCATION ATTITUDE INDEX

CODE: _____

# EDUCATION ATTITUDE INDEX*

Introduction:

You are asked to complete the index in which questions are directed at your attitudes and opinions concerning various phases of educational programming. The staff are very interested in knowing your perception of (1) environmental conditions you feel are worthwhile and desirable in elementary schools, and (2) if you feel these conditions exist in your professional education classes. The results of this study will enable the staff to plan better programs in the future.

Personal Data:

1. Complete the appropriate answer for each item.

   a. Sex:

   b. Age:

   c. Cumulative Grade Point Average:

   d. Education Grade Point Average:

2. Write the appropriate population of your home place of residence. Write farm if appropriate _____.

Directions:

Listed below are statements describing possible conditions which may exist in an elementary school in Saskatchewan. To the LEFT of each statement you are asked to rate extent to which you feel the described condition SHOULD BE WORTHWHILE OR DESIRABLE. Please rate ALL statements by circling the number of your choice.

To the RIGHT of each statement you are asked to rate the extent to which you feel this condition EXISTS as a part of the two year elementary school teacher education program at the University of Saskatchewan, Regina Campus. Please rate ALL statements by circling the number of your choice.

*Developed by Joseph A. Kalla, University of Saskatchewan, Regina, Saskatchewan, January, 1972.

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**Sample:**

| DO YOU FEEL THAT THIS SHOULD BE A WORTHWHILE OR DESIRABLE CONDITION IN AN ELEMENTARY SCHOOL IN SASKATCHEWAN. (Circle only one) | CODE FOR BOTH COLUMNS<br>1 - Always<br>2 - Almost Always<br>3 - Often<br>4 - Occasionally<br>5 - Seldom<br>6 - Almost Never<br>7 - Never | DO YOU FEEL THAT THIS CONDITION EXISTS IN THE PROFESSIONAL EDUCATION CLASSES OF THE TWO YEAR ELEMENTARY EDUCATION PROGRAM AT THE UNIVERSITY OF SASKATCHEWAN, REGINA CAMPUS. (Circle only one) |
|---|---|---|
| 1 2 3 4 5 6 7 | Individual students should be able to discuss their assignments with their teacher. | 1 2 3 4 5 6 7 |

DEFINITION OF TERMS

1. Flexible Schedule. This term refers to a time schedule for learning experiences subject to change whenever circumstances and program may dictate.

2. Interdisciplinary Instruction. This term refers to instruction involving teachers from various subject area fields working together toward the achievement of common objectives through a variety of teaching techniques.

3. Individualized Instruction. This term refers to differentiation of instruction according to individual differences in pupils.

4. Professional Education Classes in the Two Year Elementary Education Program. This refers to: (1) Education 130 - Introduction to Education, (2) Education 120 (or Psychology 100) - Education Psychology, (3) Education 140 - Methods of Art Education, (4) Education 141 - Methods of Primary Reading Education, (5) Education 143 - Methods of Language Arts Education, (6) Education 145 - Methods of Social Studies Education, (7) Education 146 - Methods of Mathematics Education, (8) Education 147 - Methods

of Music Education, (9) Education 148 - Methods of Health and Physical Education, (10) Education 149 - Methods of Science Education.

5. Team Teaching. This term refers to any form of teaching in which two or more teachers regularly and purposefully share responsibility for the planning, presentation, and evaluation of lessons prepared for the same group of students.

| DO YOU FEEL THAT THIS SHOULD BE A WORTHWHILE OR DESIRABLE CONDITION IN AN ELEMENTARY SCHOOL IN SASKATCHEWAN. (Circle only one) | CODE FOR BOTH COLUMNS<br>1 - Always<br>2 - Almost Always<br>3 - Often<br>4 - Occasionally<br>5 - Seldom<br>6 - Almost Never<br>7 - Never | DO YOU FEEL THAT THIS CONDITION EXISTS IN THE PROFESSIONAL EDUCATION CLASSES OF THE TWO YEAR ELEMENTARY EDUCATION PROGRAM AT THE UNIVERSITY OF SASKATCHEWAN, REGINA CAMPUS. (Circle only one) |
|---|---|---|
| 1 2 3 4 5 6 7 | 1.) Educational experiences should be organized within interdisciplinary subject areas. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 2.) Flexible scheduling of educational programs should increase individualization of instruction. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 3.) Problem solving techniques should be taught through an interdisciplinary approach. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 4.) School subject areas should be continually related to each other. | 1 2 3 4 5 6 7 |

| DO YOU FEEL THAT THIS SHOULD BE A WORTHWHILE OR DESIRABLE CONDITION IN AN ELEMENTARY SCHOOL IN SASKATCHEWAN. (Circle only one) | CODE FOR BOTH COLUMNS<br>1 - Always<br>2 - Almost Always<br>3 - Often<br>4 - Occasionally<br>5 - Seldom<br>6 - Almost Never<br>7 - Never | DO YOU FEEL THAT THIS CONDITION EXISTS IN THE PROFESSIONAL EDUCATION CLASSES OF THE TWO YEAR ELEMENTARY EDUCATION PROGRAM AT THE UNIVERSITY OF SASKATCHEWAN, REGINA CAMPUS. (Circle only one) |
|---|---|---|
| 1 2 3 4 5 6 7 | 5.) Team teaching techniques should be used to improve the quality of instruction. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 6.) Analyzing and applying facts should be emphasized as much as the learning of the facts. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 7.) Education should be organized around life experiences. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 8.) School program should be flexibly scheduled to permit a variety of experiences. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 9.) Subject content should be studied out of the school building. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 10.) Learning experiences out of the school building should be a part of the instructional program. | 1 2 3 4 5 6 7 |

| DO YOU FEEL THAT THIS SHOULD BE A WORTHWHILE OR DESIRABLE CONDITION IN AN ELEMENTARY SCHOOL IN SASKATCHEWAN. (Circle only one) | | DO YOU FEEL THAT THIS CONDITION EXISTS IN THE PROFESSIONAL EDUCATION CLASSES OF THE TWO YEAR ELEMENTARY EDUCATION PROGRAM AT THE UNIVERSITY OF SASKATCHEWAN, REGINA CAMPUS. (Circle only one) |
|---|---|---|
| | CODE FOR BOTH COLUMNS<br>1 - Always<br>2 - Almost Always<br>3 - Often<br>4 - Occasionally<br>5 - Seldom<br>6 - Almost Never<br>7 - Never | |
| 1 2 3 4 5 6 7 | 11.) Interdisciplinary outdoor education should be a part of school curriculum. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 12.) The winter environment should be utilized for outdoor education. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 13.) Students should be able to talk with teachers about any personal concern. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 14.) Teachers should help each student to realize his full potential as an individual. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 15.) Pupils should be allowed to participate in program planning. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 16.) Acting as a resource person should be an important function of a teacher. | 1 2 3 4 5 6 7 |

| DO YOU FEEL THAT THIS SHOULD BE A WORTHWHILE OR DESIRABLE CONDITION IN AN ELEMENTARY SCHOOL IN SASKATCHEWAN. (Circle only one) | | | CODE FOR BOTH COLUMNS<br>1 - Always<br>2 - Almost Always<br>3 - Often<br>4 - Occasionally<br>5 - Seldom<br>6 - Almost Never<br>7 - Never | DO YOU FEEL THAT THIS CONDITION EXISTS IN THE PROFESSIONAL EDUCATION CLASSES OF THE TWO YEAR ELEMENTARY EDUCATION PROGRAM AT THE UNIVERSITY OF SASKATCHEWAN, REGINA CAMPUS. (Circle only one) | |
|---|---|---|---|---|---|
| 1 2 3 4 5 6 7 | | | 17.) Cooperative student and teacher program planning should make learning relevant. | 1 2 3 4 5 6 7 | |
| 1 2 3 4 5 6 7 | | | 18.) Putting curriculum into operation should be a joint responsibility of students and teachers. | 1 2 3 4 5 6 7 | |
| 1 2 3 4 5 6 7 | | | 19.) Interaction with other students should be emphasized as much as the learning of subject matter. | 1 2 3 4 5 6 7 | |
| 1 2 3 4 5 6 7 | | | 20.) Student to student interaction on a personal basis should be provided for in the learning environment. | 1 2 3 4 5 6 7 | |
| 1 2 3 4 5 6 7 | | | 21.) Student interaction in group projects should be provided for in the learning environment. | 1 2 3 4 5 6 7 | |
| 1 2 3 4 5 6 7 | | | 22.) Group project work should lead to a feeling of oneness among fellow students. | 1 2 3 4 5 6 7 | |

| DO YOU FEEL THAT THIS SHOULD BE A WORTHWHILE OR DESIRABLE CONDITION IN AN ELEMENTARY SCHOOL IN SASKATCHEWAN. (Circle only one) | | DO YOU FEEL THAT THIS CONDITION EXISTS IN THE PROFESSIONAL EDUCATION CLASSES OF THE TWO YEAR ELEMENTARY EDUCATION PROGRAM AT THE UNIVERSITY OF SASKATCHEWAN, REGINA CAMPUS. (Circle only one) |
|---|---|---|
| 1 2 3 4 5 6 7 | 23.) Emotional and social development of a student should be as important as academic achievement. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 6 7 | 24.) A student should be taught interaction skills necessary to relate to classmates. | 1 2 3 4 5 6 7 |

CODE FOR BOTH COLUMNS
1 - Always
2 - Almost Always
3 - Often
4 - Occasionally
5 - Seldom
6 - Almost Never
7 - Never

# APPENDIX B

## OUTDOOR EDUCATION - BUFFALO POUND PROVINCIAL PARK
## ART EDUCATION INTEGRATION IDEAS

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The integration of art with other subjects of the curriculum makes both art and the subject matter more interesting and meaningful and provides opportunities for a variety and balance of learning activities. The teacher must guard against introducing art activities that become mere busy work or seat work and require no planning or organization of the child's own ideas or experiences. The art activity must not lose its identity or creative nature in the integration. Diagrams, map drawing, or copies of illustrations should not be thought of as art activities.

Policy: "current concern with environment necessitates an inter-disciplinary approach if the child is to comprehend the total relationship of man to his environment."
B. Schwartz.

"from what the world looks like to what we feel about the world and what we want the world to mean."
Aaron Siskind

Social Studies

Visualize not illustrate; design not copy; feel-sense; rationalize.

1. Researchable problems in the environment.
2. History of area.
3. How man changes the environment.
4. Man, shelter, land contour, transportation, occupation, recreation, survival.
5. Selection of the site and why.
6. Leadership roles.

Science

Observation is the basis of art and science; both selective; utilize inquiry; creativity is the closest point of art and science.

1. Compass and orienteering.
2. Water, cold, wind.
3. Light, physics, slides, filmstrips.
4. Sound.
5. Chemistry.
6. Weather, seasonal changes.
7. Plants.
8. Animals.
9. Birds.

10. Insects.
11. Sun, moon, stars.
12. Fieldtrips to woodlots and streams, temperature growth, leaves, weeds, tracks.

Physical Education and Health

1. Case study of pulse, heat, respiration, fatigue, etc.
2. Hiking, skiing, snow shoeing.
3. Rests, pacing.
4. Foods.
5. Clothing.
6. Survival.
7. Safety.

Mathematics

1. Dimensions; Fibonacci 1, 2, 3, 5, 8, 13.
2. Measuring, distance, scales, ratios, error, etc.
3. Area.
4. Height.
5. Time, space, and shape.

Others

1. Language, five senses, plays, oral or written poems.
2. Dance.
3. Music, songs, marches.

## Some Activities

Any topic using the five senses. We are perceiving, sensing, intuiting, and rationalizing, and use the elements and principles of art, composition, feeling, movement and rhythm, etc.

I. Photography - still and super 8mm movies, black and white, color.

   A. Man made environment - buildings, roads, etc.
   B. Natural environment - rocks, trees, animals.
   C. Man himself.

II. Art

   A. Collages - found materials.

# APPENDIX C

## BUFFALO POUND FIELD TRIP SCHEDULE

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## Sunday, March 12

6:00 p.m. Depart from Regina Campus
7:00 p.m. Arrive at Buffalo Pound Provincial Park
8:00 p.m. Orientation and social hour

## Monday, March 13

8:00 a.m. Breakfast
9:00 a.m. One half class: ski tour of area
One half class: project work
10:30 a.m. One half class: ski tour of area
One half class: project work
12:00 p.m. Dinner
1:30 p.m. Orienteering and project work
6:00 p.m. Supper
7:00 p.m. Project work
8:00 p.m. Social hour

## Tuesday, March 14

8:00 a.m. Breakfast
9:00 a.m. Project work including film processing
12:00 p.m. Dinner
1:30 p.m. Project work including film processing
6:00 p.m. Dinner
7:00 p.m. Project demonstrations
9:00 p.m. Social hour and astronomy instruction

## Wednesday, March 15

8:00 a.m. Breakfast
9:00 a.m. Free time and clean up
11:00 a.m. Depart for Regina Campus
12:00 p.m. Arrive at Regina Campus

# APPENDIX D

QUESTIONNAIRE - MARCH, 1971 INTERDISCIPLINARY
OUTDOOR EDUCATION PILOT PROJECT

GENERAL EVALUATION

Interdisciplinary Outdoor Education Experience - March, 1971

Directions:

State your reactions briefly. Limit your opinions to a maximum of three sentences in questions #1, #2 and #3. Give both positive (+) and negative (-) comments as appropriate.

1. Psychological Experiences

   (a). Personal

   (b). Group

2. Physical Experiences

   (a). Personal

   (b). Group

3. Social Experiences

   (a). Personal

   (b). Group

4. What would you consider as the high point and low point of your experiences?

   (a). High Point

   (b). Low Point

5. General Comments and Suggestions

Name: _____

# APPENDIX E

## MEANS AND STANDARD DEVIATIONS OF THE TOTAL SAMPLE POPULATION

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## MEANS AND STANDARD DEVIATIONS OF THE TOTAL SAMPLE POPULATION

| Variable | Number | Mean | Std. Dev. |
|---|---|---|---|
| 1. Sex | 76 | 1.97 | .16 |
| 2. Age | 76 | 21.07 | 4.27 |
| 3. C.G.P.A. | 76 | 2.63 | .59 |
| 4. E.G.P.A. | 76 | 3.05 | .63 |
| 5. Home | 76 | 2.29 | .75 |
| 6. Pretest 1, Sub-scale 1 | 76 | 12.72 | 3.58 |
| 7. Pretest 1, Sub-scale 2 | 76 | 12.93 | 3.83 |
| 8. Pretest 1, Sub-scale 3 | 76 | 12.13 | 3.49 |
| 9. Pretest 1, Sub-scale 4 | 76 | 11.70 | 3.77 |
| 10. Pretest 1, Sub-scale 5 | 76 | 26.43 | 5.03 |
| 11. Pretest 1, Sub-scale 6 | 76 | 27.50 | 5.45 |
| 12. Pretest 1, Sub-scale 7 | 76 | 25.09 | 5.82 |
| 13. Pretest 1, Sub-scale 8 | 76 | 23.05 | 5.23 |
| 14. Posttest 1, Sub-scale 1 | 76 | 12.71 | 3.58 |
| 15. Posttest 1, Sub-scale 2 | 76 | 12.18 | 3.70 |
| 16. Posttest 1, Sub-scale 3 | 76 | 11.80 | 3.93 |
| 17. Posttest 1, Sub-scale 4 | 76 | 11.43 | 3.85 |
| 18. Posttest 1, Sub-scale 5 | 76 | 26.69 | 5.60 |
| 19. Posttest 1, Sub-scale 6 | 76 | 26.63 | 6.38 |
| 20. Posttest 1, Sub-scale 7 | 76 | 25.26 | 5.88 |
| 21. Posttest 1, Sub-scale 8 | 76 | 23.71 | 6.08 |
| 22. Posttest 2, Sub-scale 1 | 76 | 11.57 | 3.70 |
| 23. Posttest 2, Sub-scale 2 | 76 | 11.61 | 3.69 |
| 24. Posttest 2, Sub-scale 3 | 76 | 10.93 | 3.20 |
| 25. Posttest 2, Sub-scale 4 | 76 | 10.33 | 3.54 |
| 26. Posttest 2, Sub-scale 5 | 76 | 27.48 | 5.57 |
| 27. Posttest 2, Sub-scale 6 | 76 | 27.87 | 5.98 |
| 28. Posttest 2, Sub-scale 7 | 76 | 26.21 | 6.12 |
| 29. Posttest 2, Sub-scale 8 | 76 | 24.51 | 6.58 |